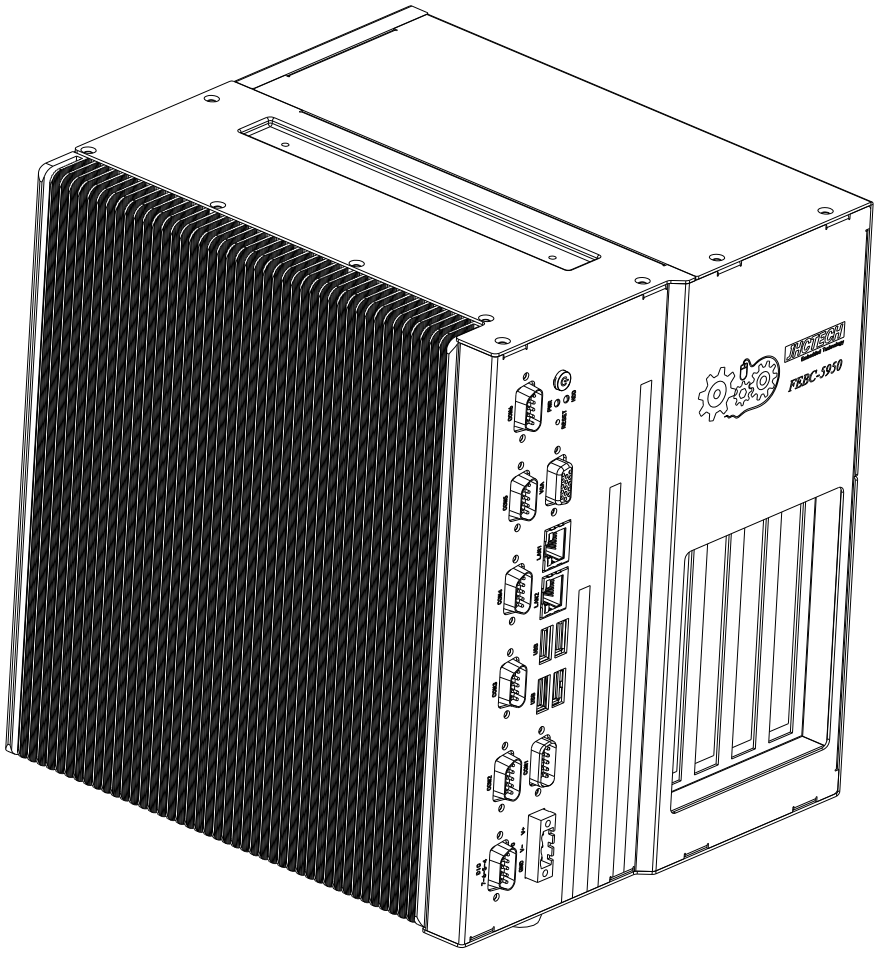
FEBC-5950
User’s Manual

FEBC-5950

1、Aluminum case , Fanless disign;
2、4th Generation Intel® Core™ processors;
3、Intel® H81 Express Chipset;
4、2xDDR3-1333/1600 SODIMM ,max 16GB;
5、1xmSATA/minipcie,2x2.5inch SATA HDD;
6、DC 9V-36V Wide voltage input;
6、VGA display;
7、6COM/8DIO;
8、2×Intel Gigabit Ethernet (I210&I217) ;
9、4xPCI or 1xPCI-E x16 + 3xPCI



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JHC warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by JHC, or which have been subject to misuse, abuse, accident or improper installation.

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1. Collect all the information about the problem encountered. (For example, CPU speed, JHC products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from JHC. Please contact your local supplier for ordering information. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Step 1. Visit the JHC web site at www.jhctech.com.cn where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or JHC's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version,application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

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CHAPTER 1

General Information

1.1 Introduction

FEBC-5950 is an intelligent,fanless embedded system powered by Intel 4th Generation Intel® CoreTM processors with multiple I/O interface and 2.5" HDD driver bay.
FEBC-5950 offers 1xVGA interface, 2xGiga Lan ports, 2xUSB3.0 ports, 2xUSB2.0 ports, 6xCOM ports, 1xMini PCIe socket，4xPCI/PCIE socket; The FEBC-5950 supports two 2.5" SATA HDD driver bay,1xmSATA for storage options.

1.2 Features

Key features

1、Aluminum case , Fanless disign;
2、4th Generation Intel® CoreTM processors;
3、2xDDR3-1333/1600 SODIMM ,max 16GB;
4、1xmSATA,2x2.5inch SATA HDD;
5、1xminipcie/mSATA;
6、DC 9V～36V Wide voltage input；
6、VGA display;
7、6COM/8DIO;
8、2×Intel Gigabit Ethernet ；
9、4xPCI or 1xPCI-E x16 + 3xPCI

1.3 Specifications

1.3.1 General

CPU: Intel® CoreTM i3-4330T (4M Cache, 3.0 GHz) 35W;
Intel® Pentium® Processor G3220T (3M Cache, 2.60 GHz) 35W;
Intel® Core™ i5-4670T Processor (6M Cache, up to 3.30 GHz) 45W

BIOS: AMI BIOS

System Memory: Up to 16G DDR3 1333/1600GHz SODIMM

Watchdog Timer: 255-level interval timer, setup by software

Serial Ports:

– 4x RS-232, 2 x RS-232/422/485

DIO:

– 8 bit DIO

USB:

– 2 x USB 2.0 compliant Ports, 2xUSB3.0 compliant port.

Expansion Interface: Support up to 1 x full size Mini-PCIe , 4xPCI or 1xPCI-E x16 + 3xPCI

Storage:

– Supports 1 xmSATA
– SATA: Support `2x 2.5" SATAII HDD

1.3.2 Display

Chipset: Intel HD Graphics;

Display Memory: Shared system memery

VGA Resolution: up to 1920x1200 pixels with 24-bit color @ 60Hz

1.3.3 Ethernet

Chipset: 1xIntel WGI210 Gigabit Ethernet; 1x Intel® I217 Gigabit Ethernet Phy

Speed: 10/100/1000 Mbps

Interface: Up to 2 x RJ45

1.3.4 Power Consumption

Input Voltage: DC 9~36V

Power Adapter: AC to DC 19 V/6.32 A, 120 W

1.3.5 Power Requirement

System power:

– Minimum power input: DC 12 V 5 A

1.4 Environmental Specifications

Operating temperature: -10 ~ 55° C (With extended temperature mSATA devices) & 0 ~ 50° C (With standard temperature mSATA&HDD devices)

Relative humidity: 95% @ 40°C (non-condensing)

Storage temperature: -20 ~ 70°C (-40 ~ 185°F)

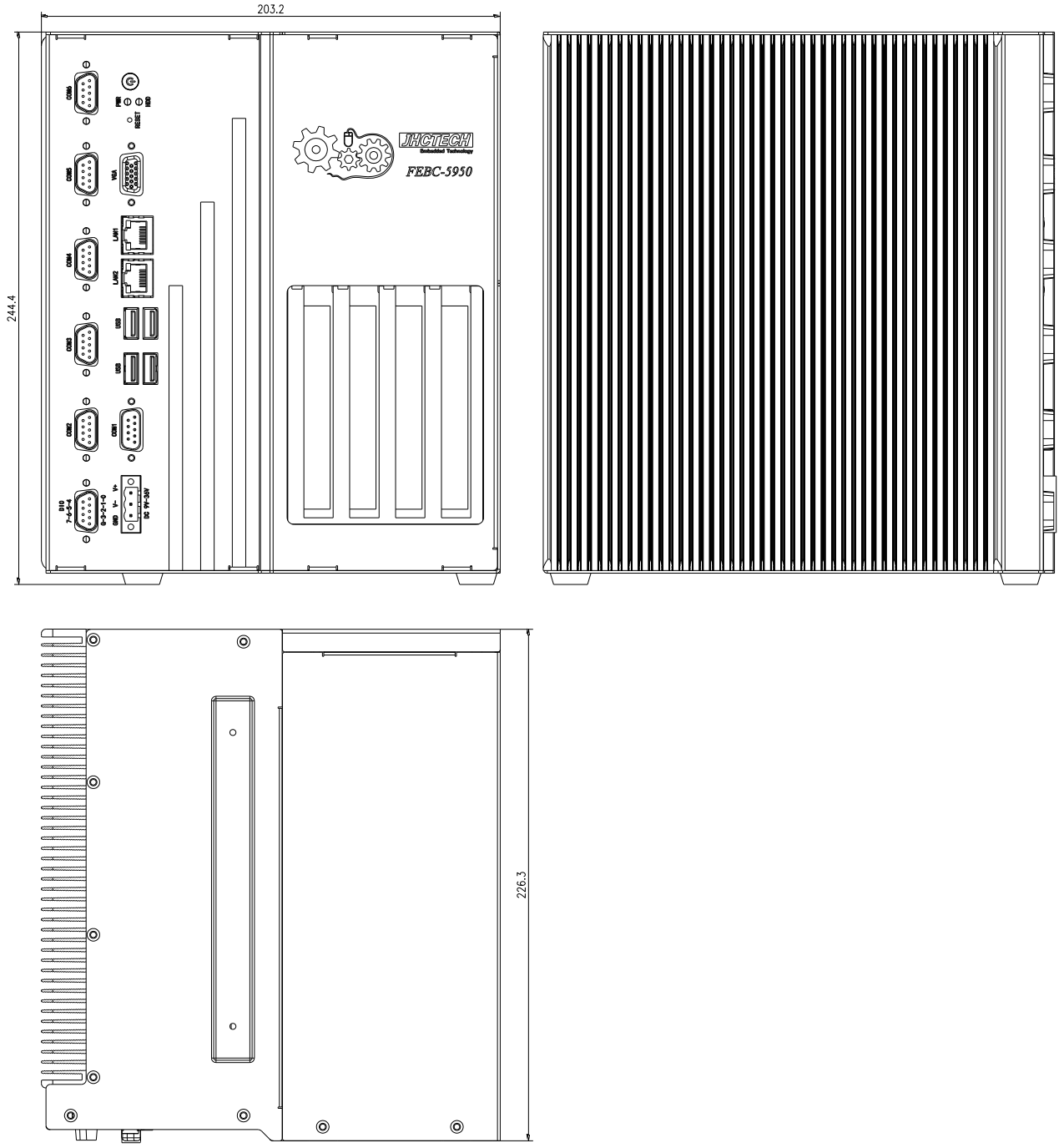
Vibration loading during operation:

– With SSD/mSATA: 3 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis

EMC: CE, FCC Class A

1.5 Mechanical Specifications

FEBC-5950 Dimensions:



CHAPTER 2

Hardware Installation

2.1 Introduction

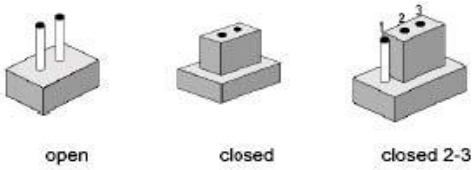
The following sections show the internal jumper settings and the external connectors and pin assignments for applications.

2.2 Jumpers and connectors

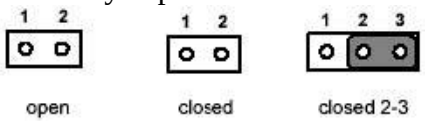
The FEBC-5950 Embedded Box Computer consists of an JHC SBC (Single Board Computer) board that is housed in an aluminum plate chassis. Your HDD and SDRAM, are all readily accessible by removing the aluminum bottom cover. Any maintenance or hardware upgrades can be easily completed after removing the bottom cover.
Warning:Do not remove any mechanical parts until you have verified that no power is flowing within the Embedded Box Computer. Power must be switched off and the power cord must be unplugged.

2.2.1 Setting Jumpers

You can configure your FEBC-5950 to match the needs of your application by setting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To —close“ a jumper, you connect the pins with the clip. To —open“ a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either pins 1 and 2 or pins 2 and 3.



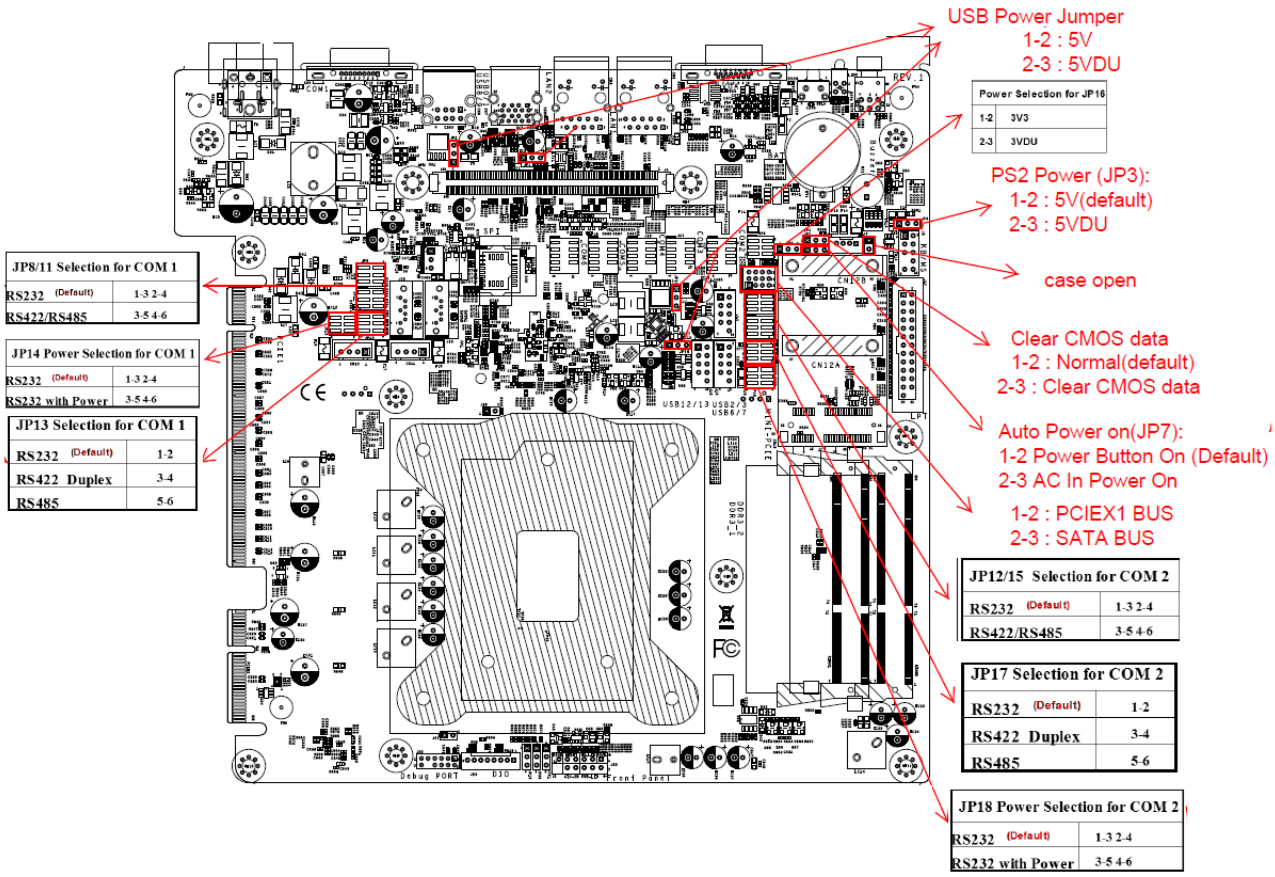
The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

2.3 Jumper Location

The FEBC-5950 Embedded Box Computer has a number of jumpers inside the chassis that allows you to configure your system to suit your application. The table below lists the functions of the various jumpers. The table below shows the function of each of the board's jumpers:



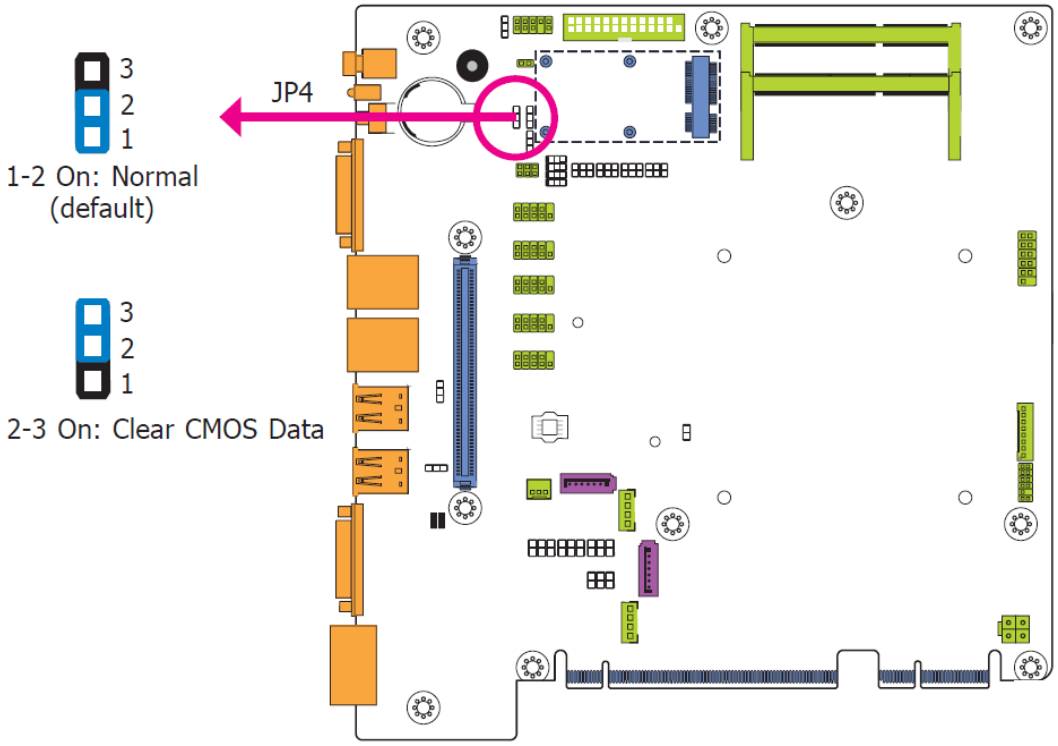
Jumpers

Jumper	Name	Description
JP4	Clear CMOS Date	3-Pin Block
JP1	USB power select	3-Pin Block
JP2	USB power select	3-Pin Block
JP7	Auto Power-on Select	3-Pin Block
JP8	COM1 RS232/422/485 select	6-Pin Block
JP11		6-Pin Block
JP13		6-Pin Block
JP14	COM1 RS232/power select	6-pin Block
JP12	COM2 RS232/422/485 select	6-pin Block
JP15		6-pin Block
JP17		6-pin Block
JP18	COM4 RS232/power select	6-pin Block
JP9	Mini PCIe Signal Select	12-pin Block
JP6	Mini PCIe Power Select	3-Pin Block

Headers

Header	Name	Description
Front Panel	Front Panel header	11-pin block
SATA Power 0/SATA Power 1	SATA (Serial ATA) Power Connectors	5-pin block
KB/MS	PS/2 Keyboard/Mouse Connector	9-pin block
COM2/COM3/ COM4/COM5/ COM6	Serial port headers	9-pin block
Digital I/O	Digital I/O Connector	8-Pin block

2.3.1 JP4: Clear CMOS Date



If you encounter the following,

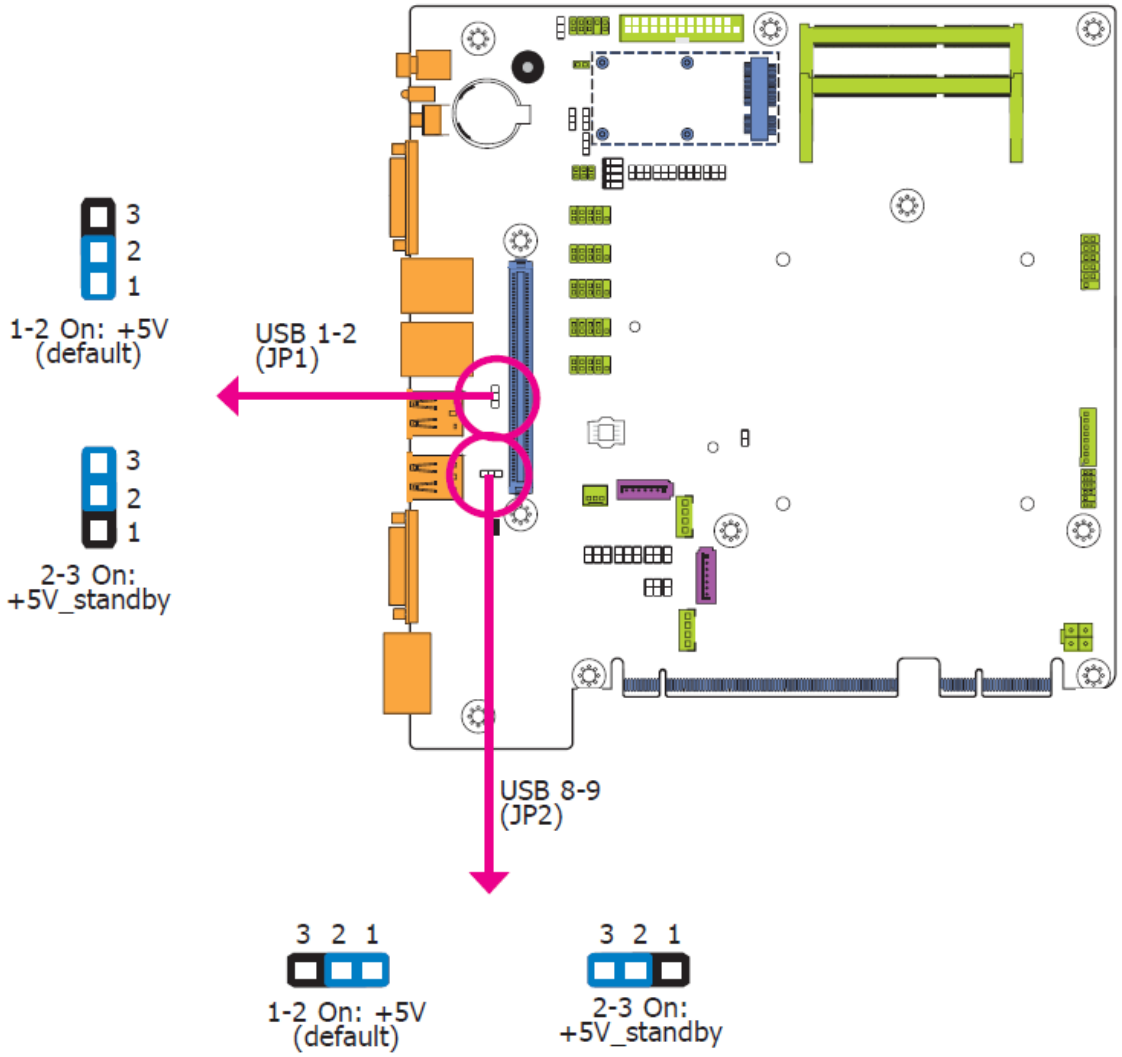
a) CMOS data becomes corrupted.
b) You forgot the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS. To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.
2. Set JP4 pins 2 and 3 to On. Wait for a few seconds and set JP4 back to its default setting, pins 1 and 2 On.

3. Now plug the power cord and power-on the system.

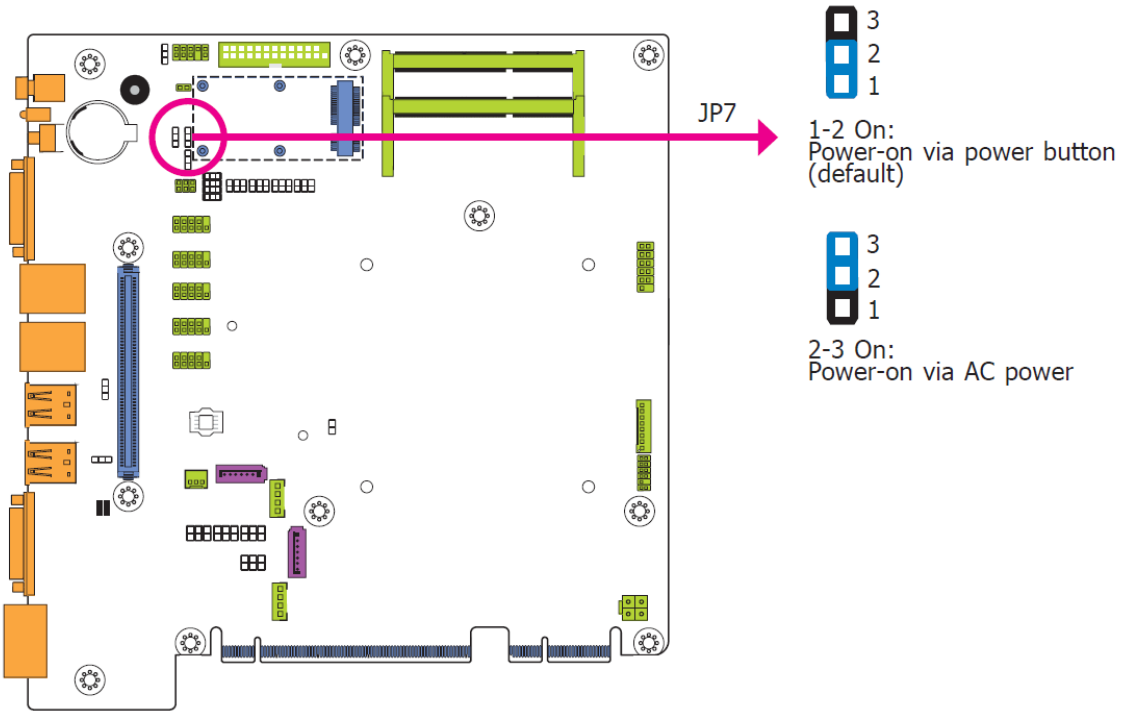
2.3.2 JP1/2 USB Power Select



JP1, JP2 are used to select the power of the USB ports. Selecting +5V_standby will allow you to use a USB device to wake up the system.

Important:
If you are using the Wake-On-USB Keyboard/Mouse function for 2 USB ports, the+5V_standby power source of your power supply must support ≥1.5A. For 3 or moreUSB ports, the +5V_standby power source of your power supply must support ≥2A.

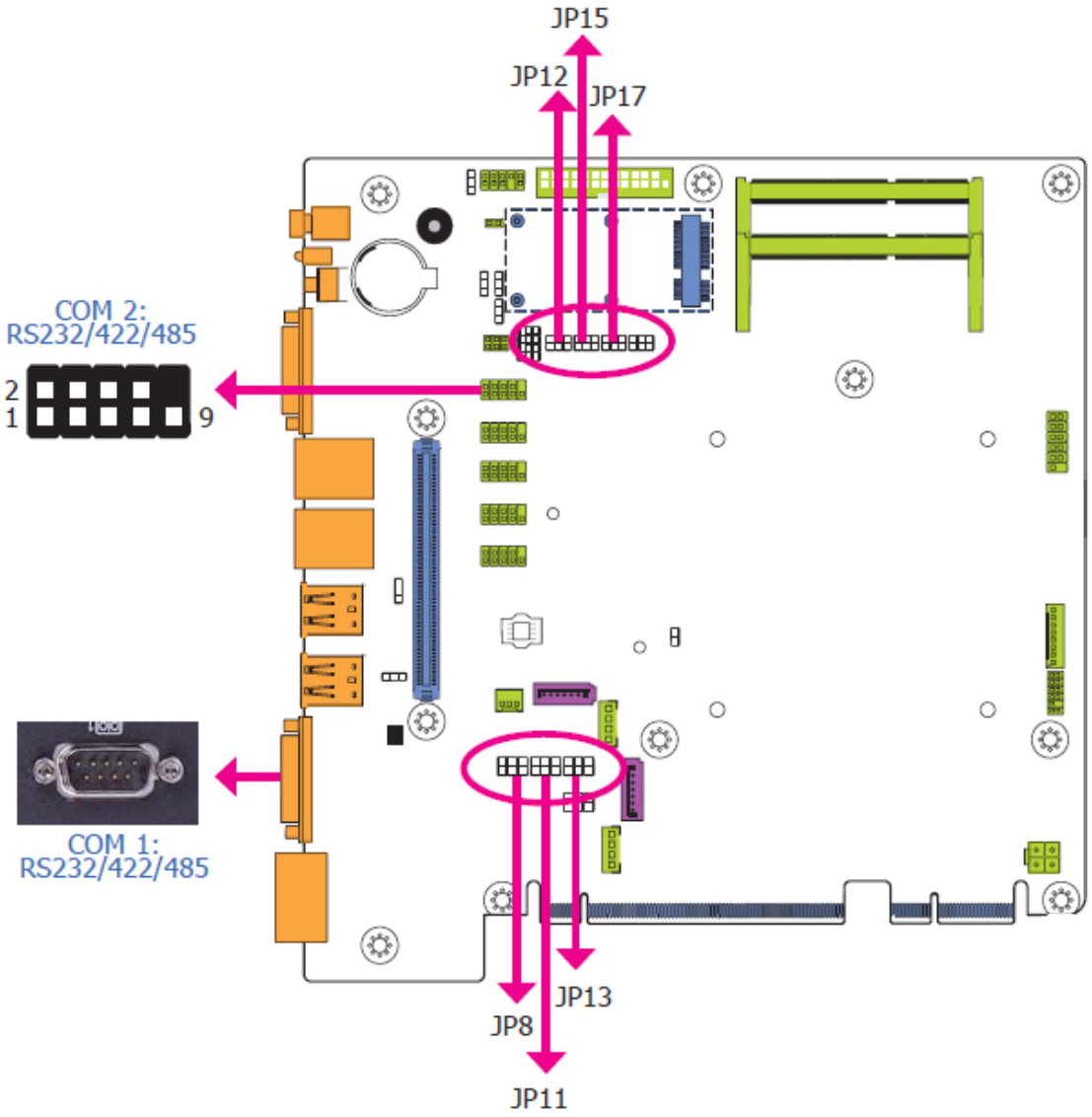
2.3.3 Auto Power-on Select



JP7 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP7 pins 2 and 3 to On. If you want to use the powerbutton, set pins 1 and 2 to On.

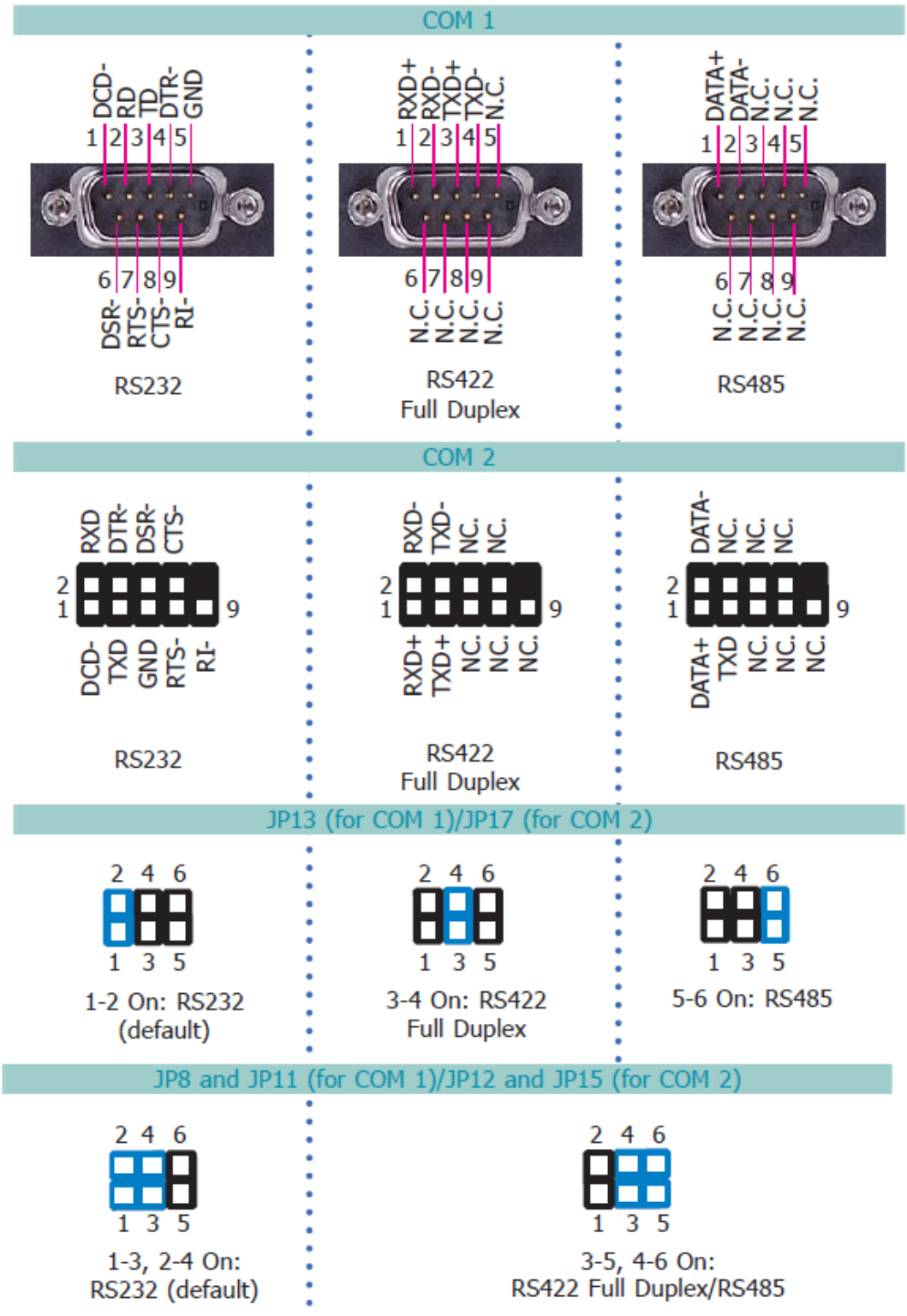
When using the JP7 “Power On” feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

2.3.4 COM 1/COM 2 RS232/422/485 Select

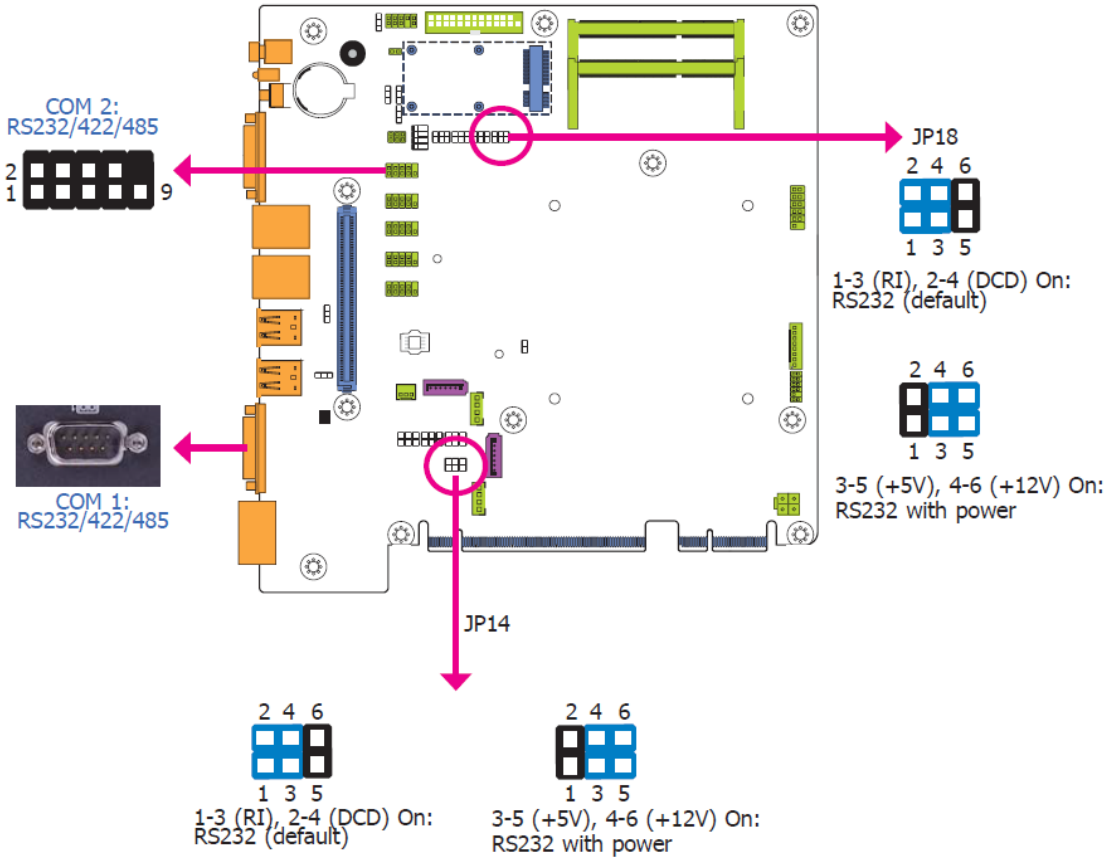


These jumpers allow you to configure the Serial COM ports to RS232, RS422 (Full Duplex) or RS485. JP8, JP11 and JP13 are used to configure the Serial COM port 1. JP12, JP15 and JP17 are used to configure the Serial COM port 2. The pin functions of Serial COM ports 1 and 2 will vary according to these jumpers' setting.

Note:
When COM 1 RS232/422/485 is selected, JP11 and JP13 must be set in accordance to JP8. And when COM 2 RS232/422/485 is selected, JP15 and JP17 must be set in accordante to JP12.

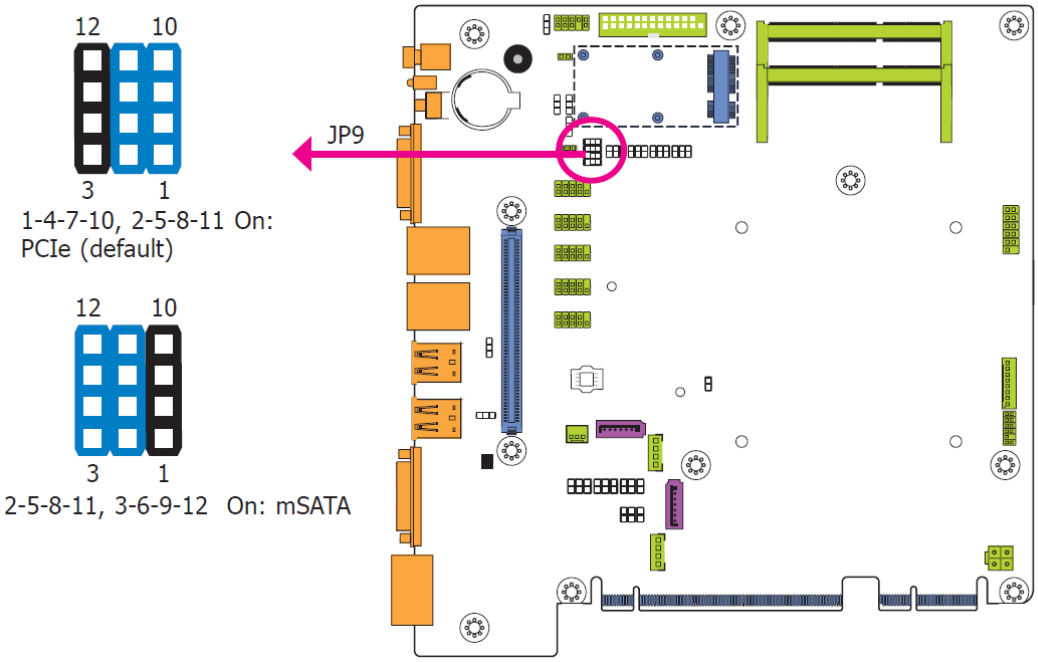

COM 1
DCD- RD TD DTR- GND
1 2 3 4 5
6 7 8 9
DSR- RTS- CTS- RI-
RS232
RXD+ RXD- TXD+ TXD- N.C.
1 2 3 4 5
6 7 8 9
N.C. N.C. N.C. N.C.
RS422
Full Duplex
DATA+ DATA- N.C. N.C. N.C.
1 2 3 4 5
6 7 8 9
N.C. N.C. N.C. N.C.
RS485
COM 2
RXD DTR- DSR- CTS-
2 1 9
DCD- TXD GND RTS- RI-
RS232
RXD- TXD- N.C. N.C.
2 1 9
RXD+ TXD+ N.C. N.C. N.C.
RS422
Full Duplex
DATA- N.C. N.C. N.C.
2 1 9
DATA+ TXD N.C. N.C. N.C.
RS485
JP13 (for COM 1)/JP17 (for COM 2)
2 4 6
1 3 5
1-2 On: RS232
(default)
2 4 6
1 3 5
3-4 On: RS422
Full Duplex
2 4 6
1 3 5
5-6 On: RS485
JP8 and JP11 (for COM 1)/JP12 and JP15 (for COM 2)
2 4 6
1 3 5
1-3, 2-4 On:
RS232 (default)
2 4 6
1 3 5
3-5, 4-6 On:
RS422 Full Duplex/RS485

2.3.5 COM 1/COM 2 RS232/Power Select



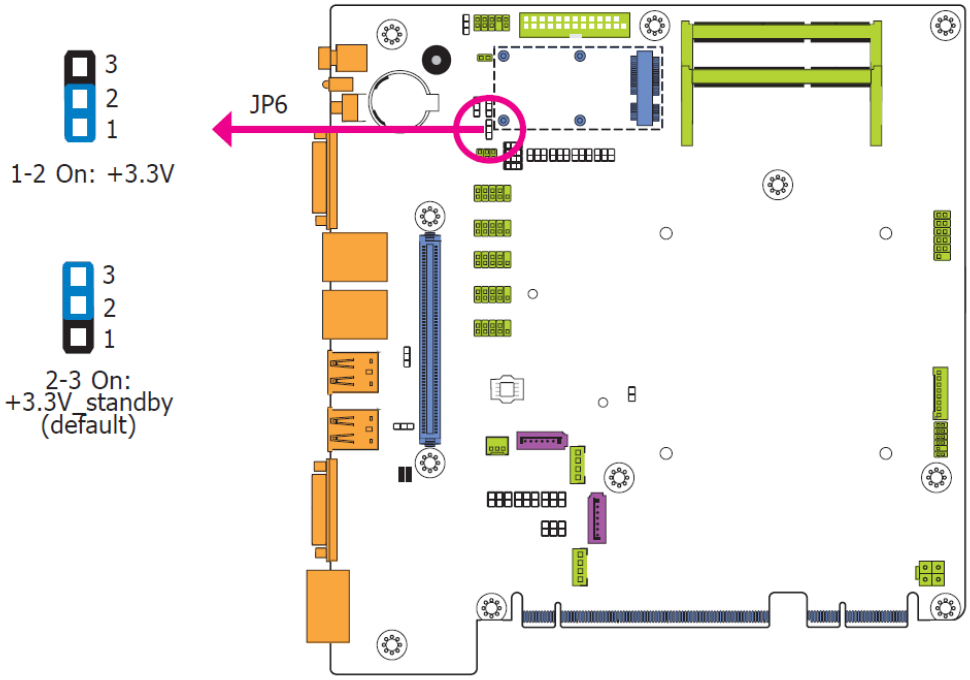
JP14 (for COM 1) and JP18 (for COM 2) are used to configure the Serial COM ports to pure RS232 or RS232 with power.

2.3.6 Mini PCIe Signal Select



JP9 is used to select the Mini PCIe signal: PCIe or mSATA.

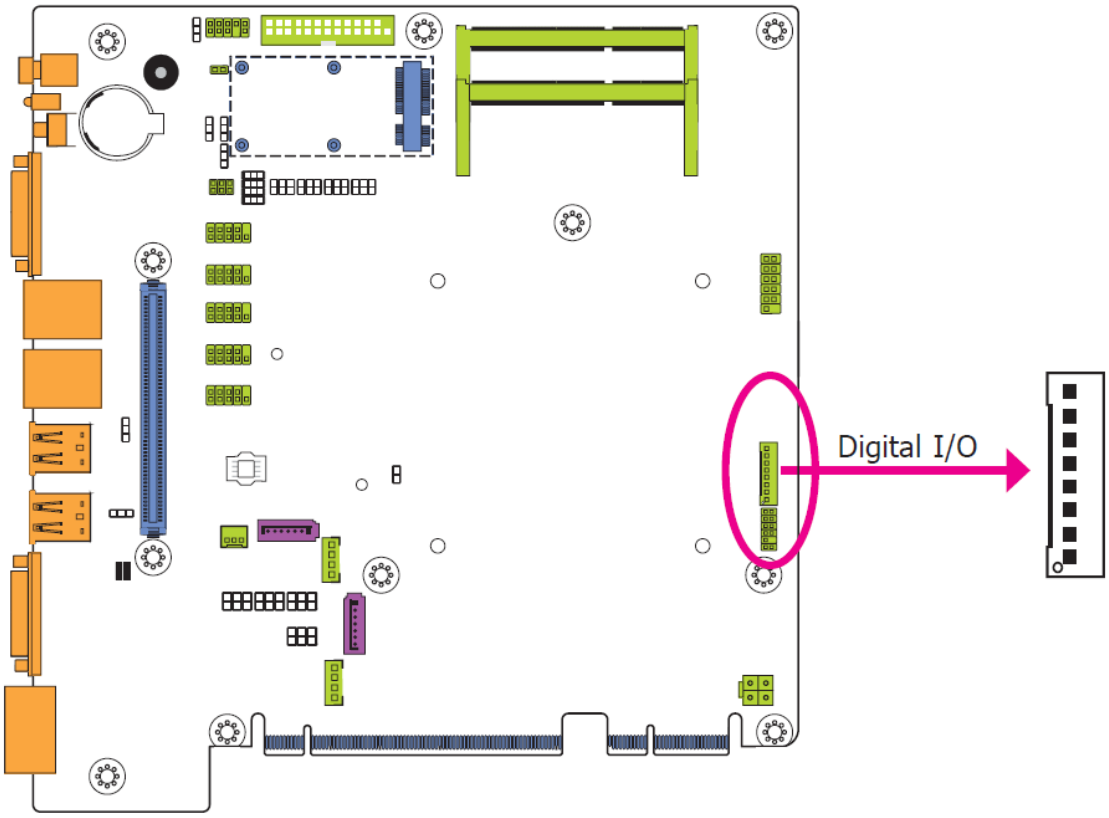
2.3.7 Mini PCIe Power Select



JP6 is used to select the power supplied with the Mini PCIe.

2.3.8 Digital I/O Connectors

Digital I/O Connector

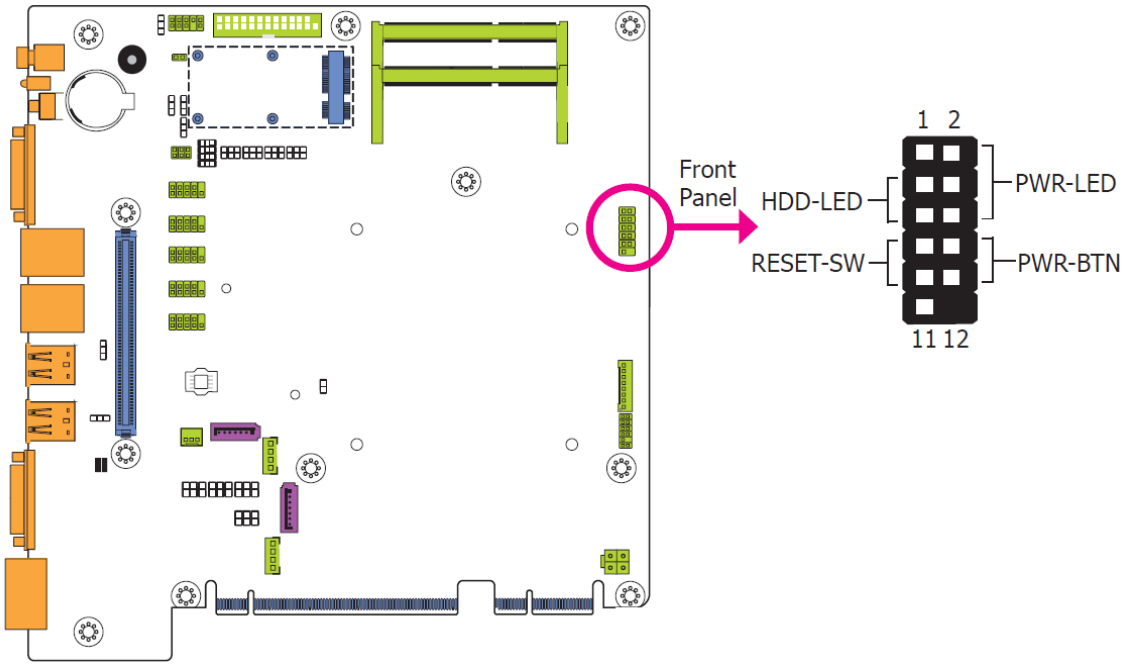


The 8-bit Digital I/O connector provides powering-on function to external devices that are connected to the connector.

Digital I/O Connector

Pins	Function	Pins	Function
1	DIO0	2	DIO1
3	DIO2	4	DIO3
5	DIO4	6	DIO5
7	DIO6	8	DIO7

2.3.9 Front Panel Connector



HDD-LED - HDD LED
This LED will light when the hard drive is being accessed.

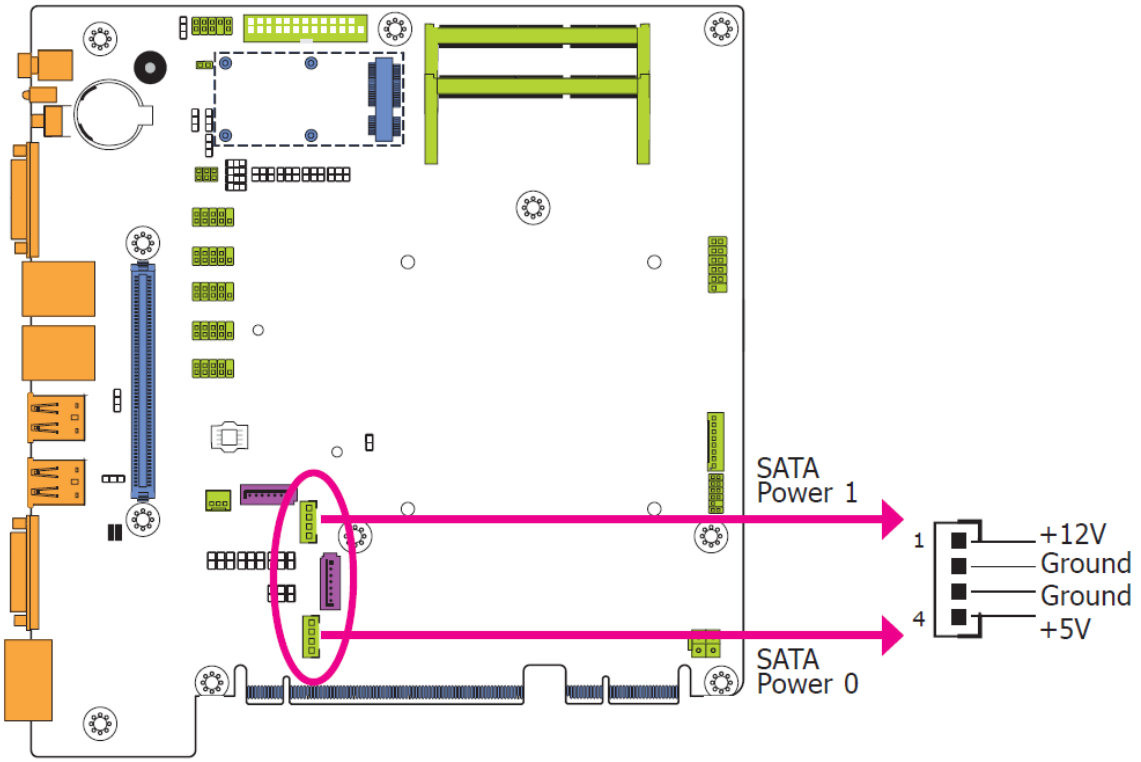
RESET-SW - Reset Switch
This switch allows you to reboot without having to power off the system.

PWR-BTN - Power Switch
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED
When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Pin Assignment		Pin	Pin Assignment
HDD-LED	3	HDD Power	PWR-LED	2	LED Power
	5	Signal		4	LED Power
RESET-SW	7	Ground		6	Signal
	9	RST Signal	PWR-BTN	8	Ground
	11	N.C.		10	Signal

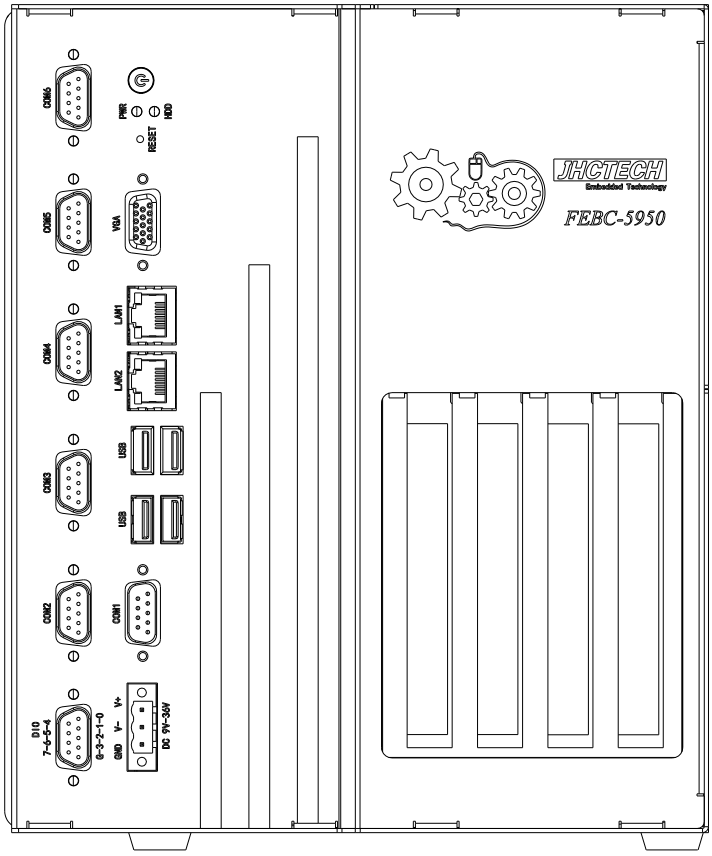
2.3.10 SATA Power Connectors



These SATA power connectors supply power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

2.4 I/O indication

Rear view



2.4.1 Ethernet Connector (LAN)

The FEBC-5950 is equipped with two Intel WGI210IT for 10/100/1000Mbps Ethernet controllers. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (white LED). Table 2.2 for pin assignments

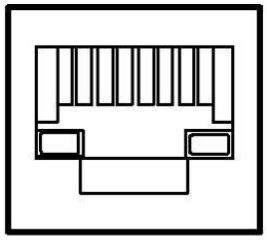


Figure 2.4 Ethernet Connector

Table 2.2: RJ-45 Connector pin assignments	
Pin	10/100/1000BaseT Signal Name
1	TX+(10/100), BI_DA+(GHz)
2	TX-(10/100), BI_DA-(GHz)
3	RX+(10/100), BI_DB+(GHz)

4	BI_DC+(GHz)
5	BI_DC-(GHz)
6	RX-(10/100), BI_DB-(GHz)
7	BI_DD+(GHz)
8	BI_DD-(GHz)

Note: NC represents —No Connection“

2.4.2 Power Input Connector (DC-IN)

The FEBC-5950 comes with a DC-in power jack: 3-pole Phoenix terminal block that 9~36V external power input. Please refer to Table 2.3 for their pin assignments.

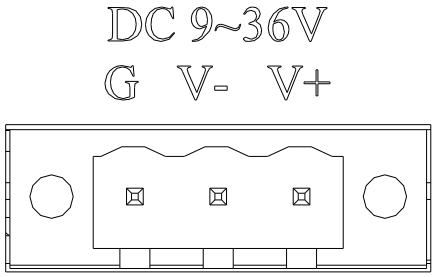


Figure 2.3 Power Conector

Table 2.3: Power Connector Pin Assignments	
Pin	Signal Name
1	G——GND
2	V-——电源负极
3	V+——电源正极

2.4.3 USB 2.0 Connector

The FEBC-5950 can support up to five USB-interface connectors. By default it provides two USB-interface connectors located on the front metal faceplate, and an additional three USB-interface connectors can be supported through adding the Dual-USB Cable-Bracket. These USB-interface connectors give complete Plug & Play and hot swap capability for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliance. The USB inter-face can be disabled in the system BIOS setup.
The USB-interface connector is used for connecting any device that con-forms to the USB interface. Many recent digital devices conform to this standard. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.

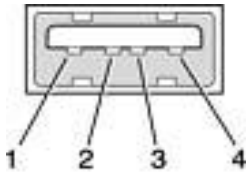


Figure 2.6 USB connector

Table 2.4: USB Connector	
Pin	Signal name
1	VCC
2	USB_P0
3	USB_P0+
4	GND

2.4.4 COM1/COM2 Connector

The FEBC-5950 provides two D-sub 9-pin connector, which offers two RS-232/422/485 serial communication interface port of COM1 and COM2. The default setting of COM1/2 is RS-232. Please refer to Table 2.5 for their pin assign-ments and jumper settings for setting up RS-422 and RS-485.

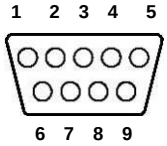


Figure 2.7: COM 1/COM2 Connector

Table 2.5: COM1~2 Serial Port Pin Assignments			
	RS-232	RS-422	RS-485
Pin	Signal Name	Signal Name	Signal Name
1	DCD	Rx+	DATA+
2	RxD	Rx-	DATA-
3	TxD	Tx+	NC
4	DTR	Tx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note: NC represents —No Connection“

2.4.5 COM3/COM4/COM5/COM6 Connector

The FEBC-5950 provides Four RS-232 ports by two D-sub 9-pin con-nectors. Please refer to Table 2.6 for their pin assignments.

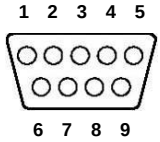
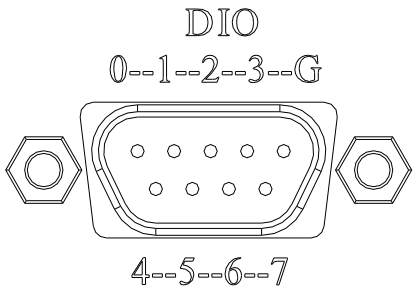


Figure 2.8: COM3, COM4 Connector

Table 2.6: COM3~6 Serial Port Pin Assignments	
Pin	Signal Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2.4.6 DIO Connector



Digital I/O Connector

Pin	NO.	Pin	NO.
1	DIO0	6	DIO4
2	DIO1	7	DIO5
3	DIO2	8	DIO6
4	DIO3	9	DIO7
5	DIO_GND		

CHAPTER 3

BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board.The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.
It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are key- board commands. The commands are available at the right side of each setup screen.
The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message “Press DEL to run setup” will appear on the screen. If the message disappears before you respond, restart the system or press the “Reset” button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the hightlight up or down between submenu or fields.
<Esc>	Exit to the BIOS Setup Utility.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
Tab	Select a field.
<F1>	Displays General Help
<F2>	Pervious values
<F3>	Optimized defaults
<F4>	Saves and resets the setup program
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

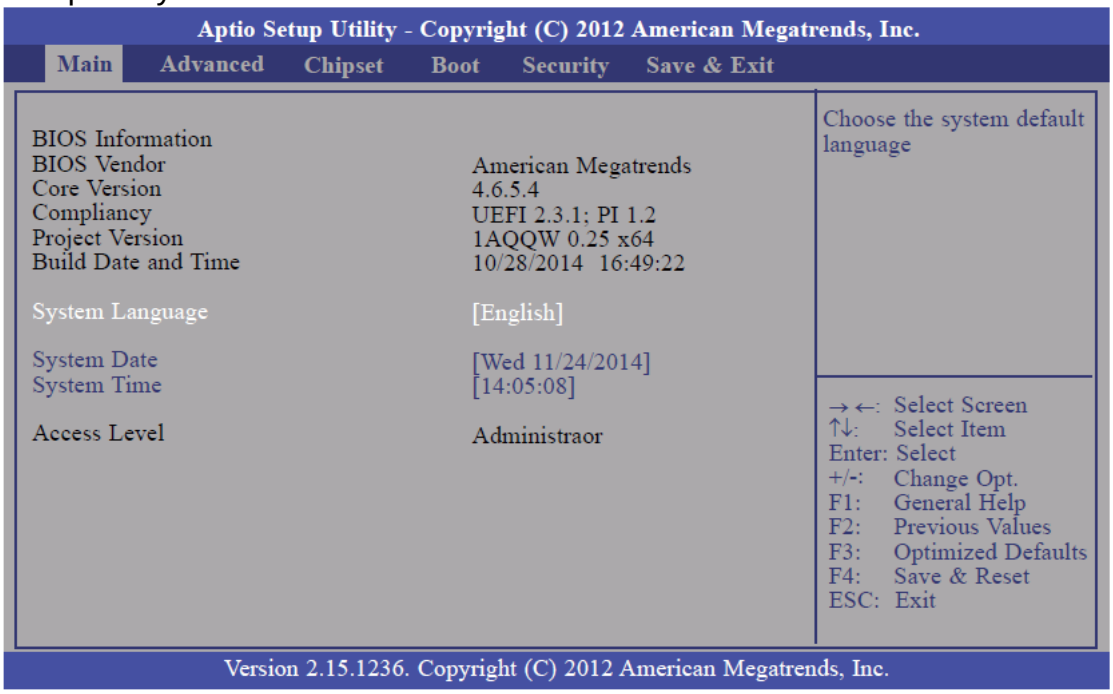
Submenu

When “ “ appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

AMI BIOS Setup Utility

3.1 Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

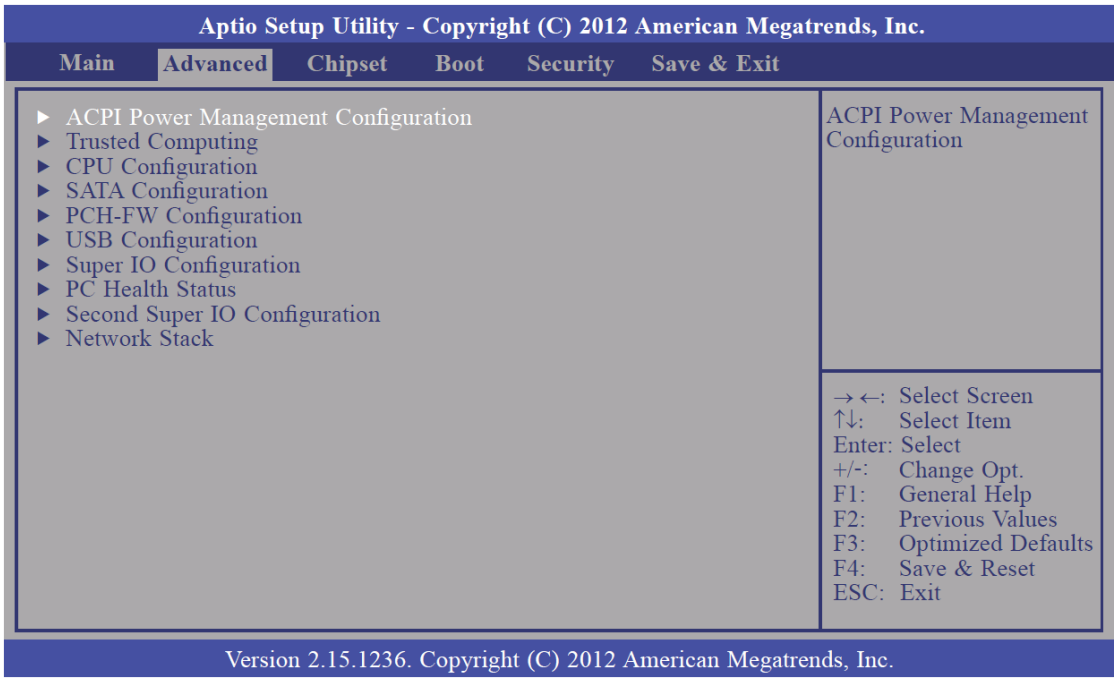
System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sun- day to Saturday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1980 to 2099.

3.2 Advanced

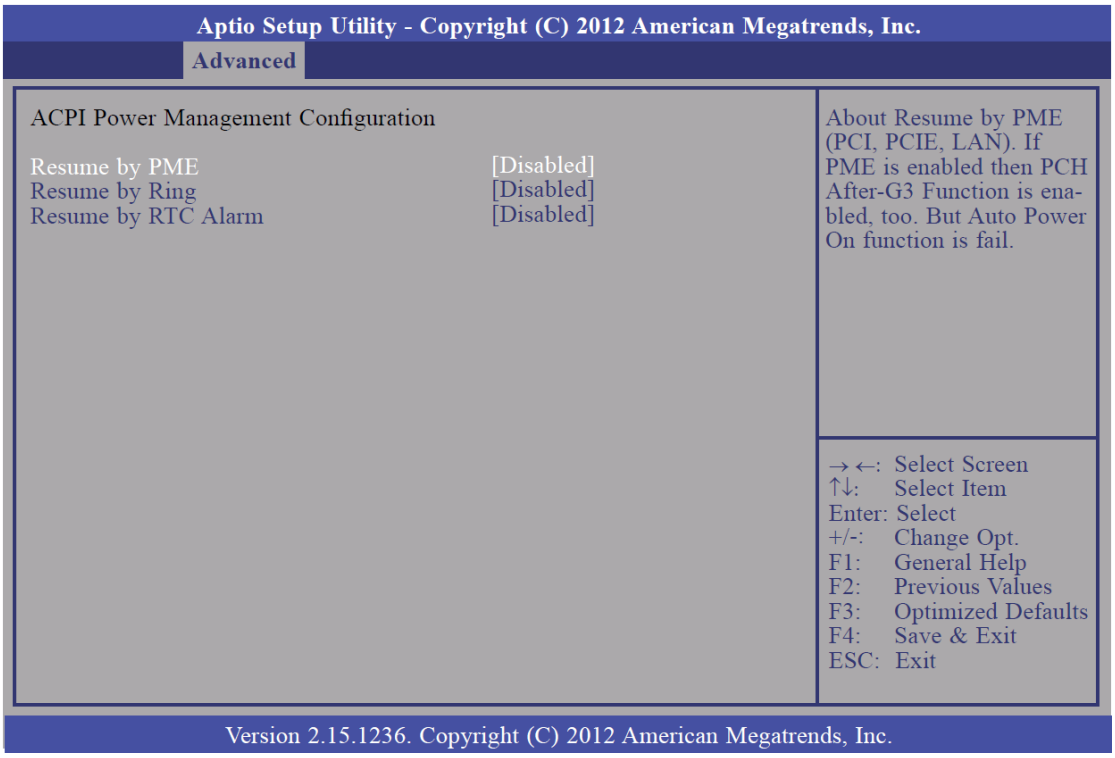
The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

Important:
Setting incorrect field values may cause the system to malfunction.



3.2.1 ACPI Power Management Configuration

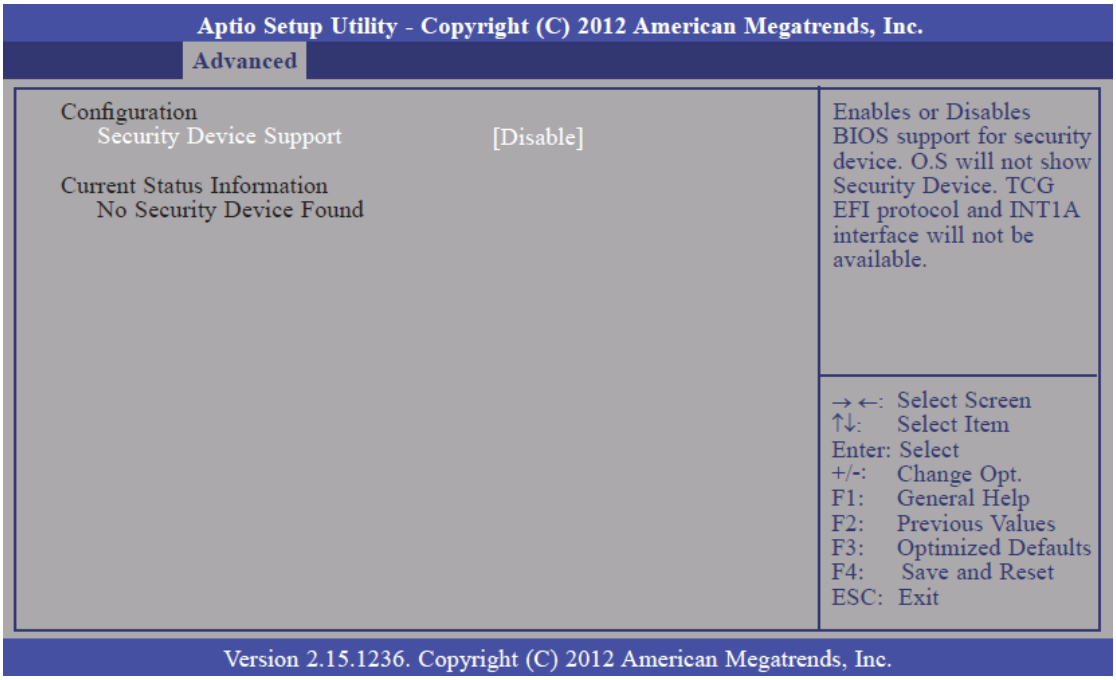
This section is used to configure the ACPI power management.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ACPI Power Management Configuration
Resume by PME [Disabled]
Resume by Ring [Disabled]
Resume by RTC Alarm [Disabled]
About Resume by PME (PCI, PCIE, LAN). If PME is enabled then PCH After-G3 Function is enabled, too. But Auto Power On function is fail.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Resume by PME
Enables this field to use the PME signal to wake up the system.
Resume by Ring
Enables this field to use the Ring signal to wake up the system.
Resume by RTC Alarm
When Enabled, the system uses the RTC to generate a wakeup event.

3.2.2 Trusted Computing

This section configures settings relevant to Trusted Computing innovations.

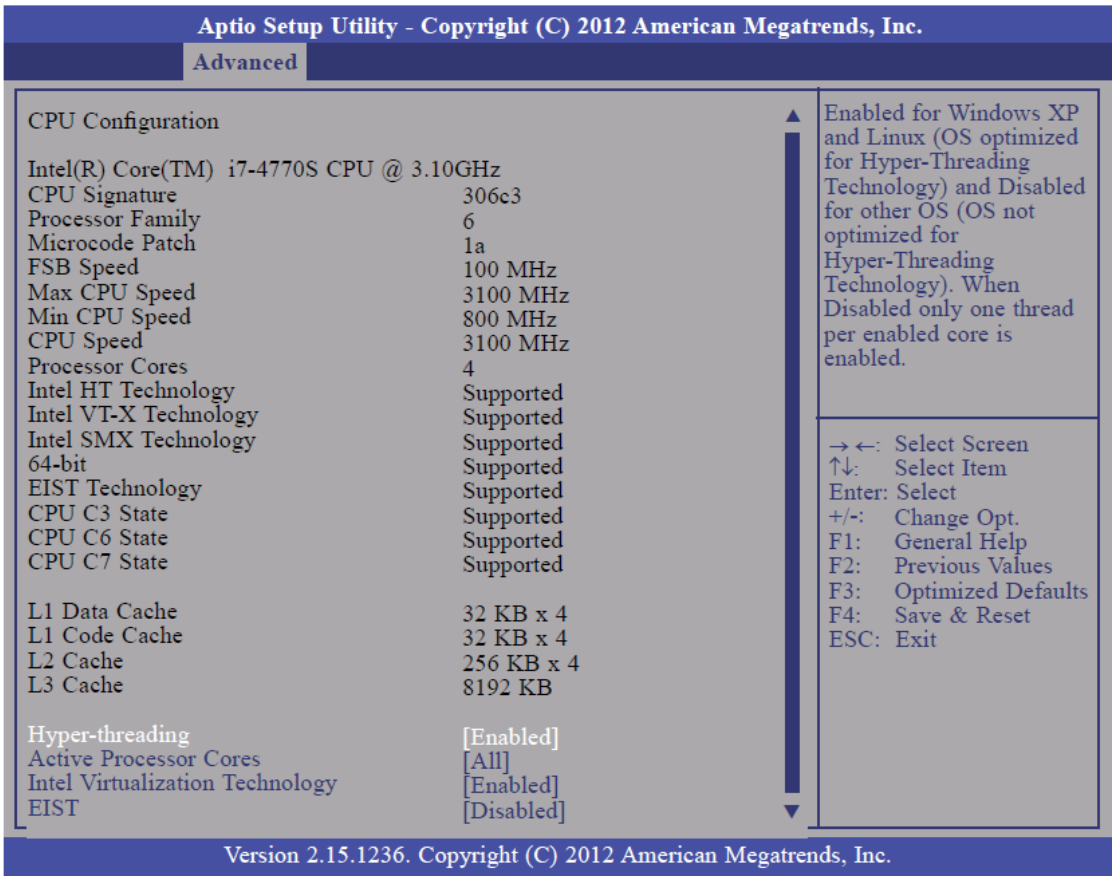

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Configuration
Security Device Support
[Disable]
Current Status Information
No Security Device Found
Enables or Disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save and Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Security Device Support

This field is used to enable or disable BIOS supporting for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

3.2.3 CPU Configuration

This section is used to configure the CPU. It will also display the detected CPU information.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
CPU Configuration
Intel(R) Core(TM) i7-4770S CPU @ 3.10GHz
CPU Signature 306c3
Processor Family 6
Microcode Patch 1a
FSB Speed 100 MHz
Max CPU Speed 3100 MHz
Min CPU Speed 800 MHz
CPU Speed 3100 MHz
Processor Cores 4
Intel HT Technology Supported
Intel VT-X Technology Supported
Intel SMX Technology Supported
64-bit Supported
EIST Technology Supported
CPU C3 State Supported
CPU C6 State Supported
CPU C7 State Supported
L1 Data Cache 32 KB x 4
L1 Code Cache 32 KB x 4
L2 Cache 256 KB x 4
L3 Cache 8192 KB
Hyper-threading [Enabled]
Active Processor Cores [All]
Intel Virtualization Technology [Enabled]
EIST [Disabled]
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Hyper-threading

Enables this field for Windows XP and Linux which are optimized for Hyper-Threading
technology. Select disabled for other OSes not optimized for Hyper-Threading technology.

When disabled, only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to enable in each processor package.

Intel Virtualization Technology

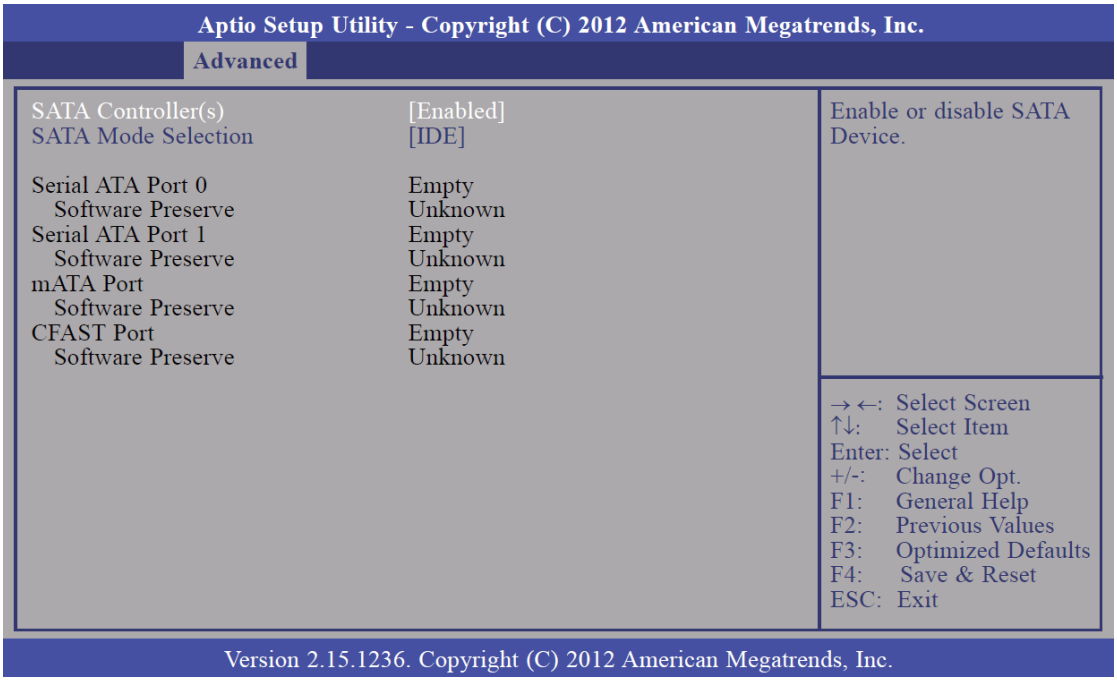
When this field is set to Enabled, the VMM can utilize the additional hardware capabilities
provided by Vanderpool Technology.

EIST

This field is used to enable or disable the Intel Enhanced SpeedStep Technology.

3.2.4 SATA Configuration

This section is used to configure the settings of Serial ATA devices.



SATA Controller(s)

This field is used to enable or disable the Serial ATA devices.

SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

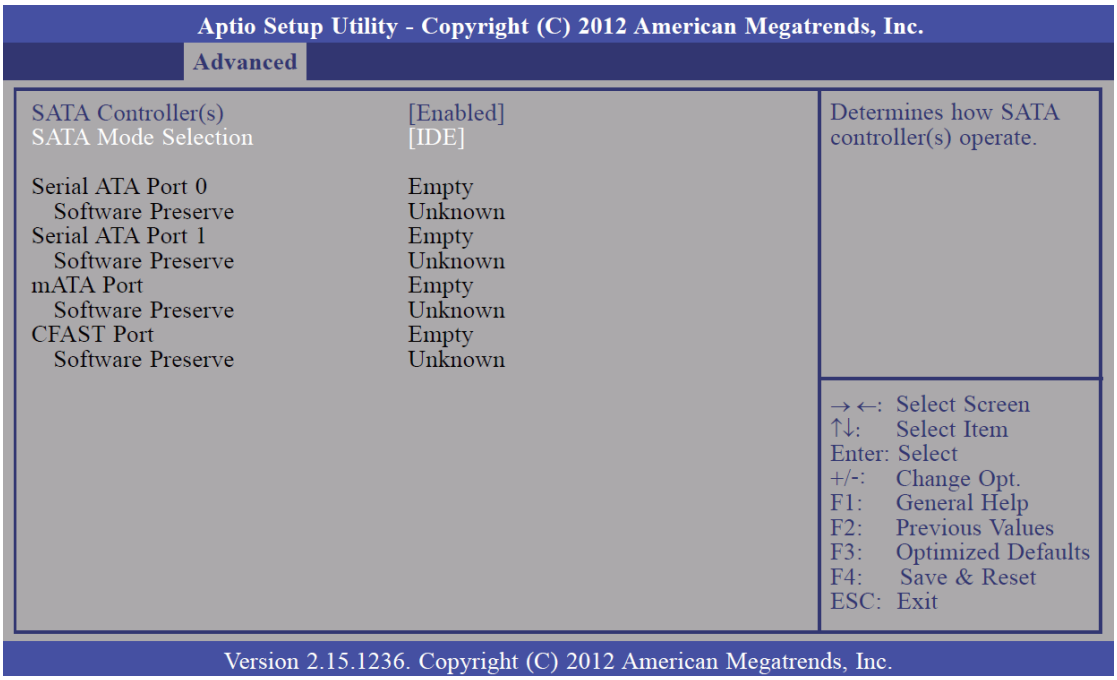
IDE Mode

This option configures the Serial ATA drives as Parallel ATA storage devices.

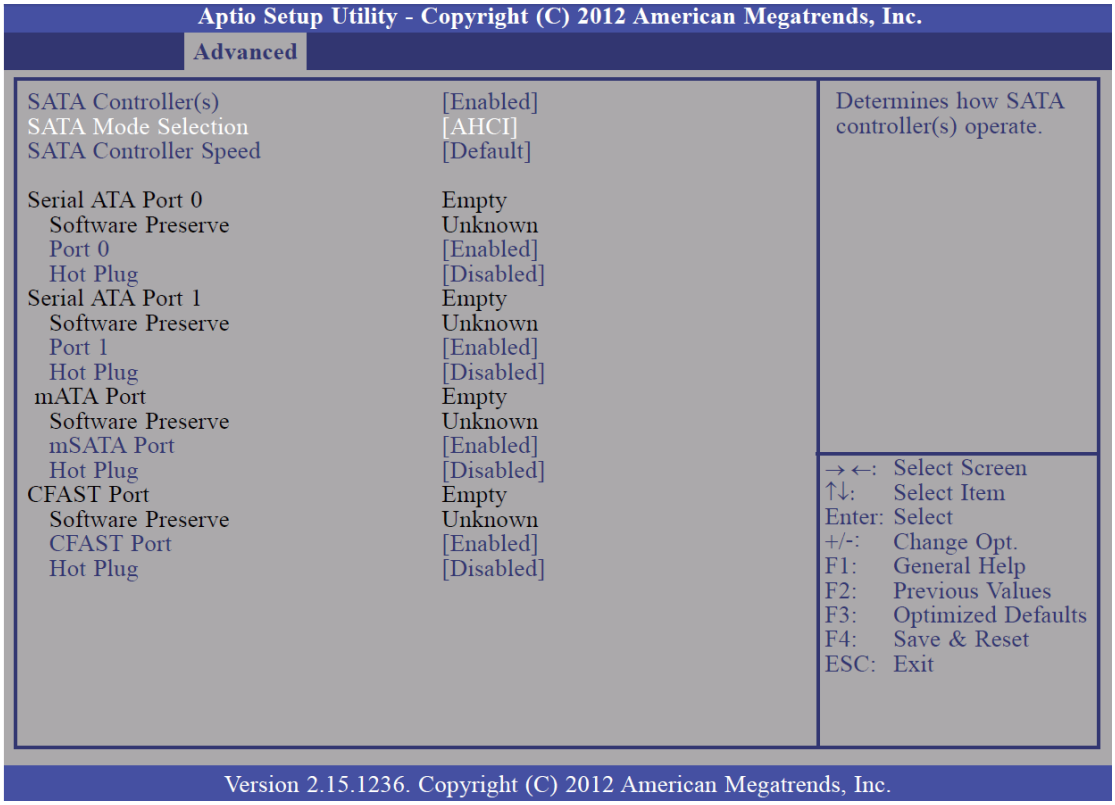
AHCI Mode

This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).

When IDE mode is selected in the SATA Mode Selection, it will display the following information:



When AHCI mode is selected in the SATA Mode Selection, it will display the following information:



SATA Controller Speed

Indicates the maximum speed that the Serial ATA controller can support.

Port 0, Port 1, mSATA Port, CFAST Port

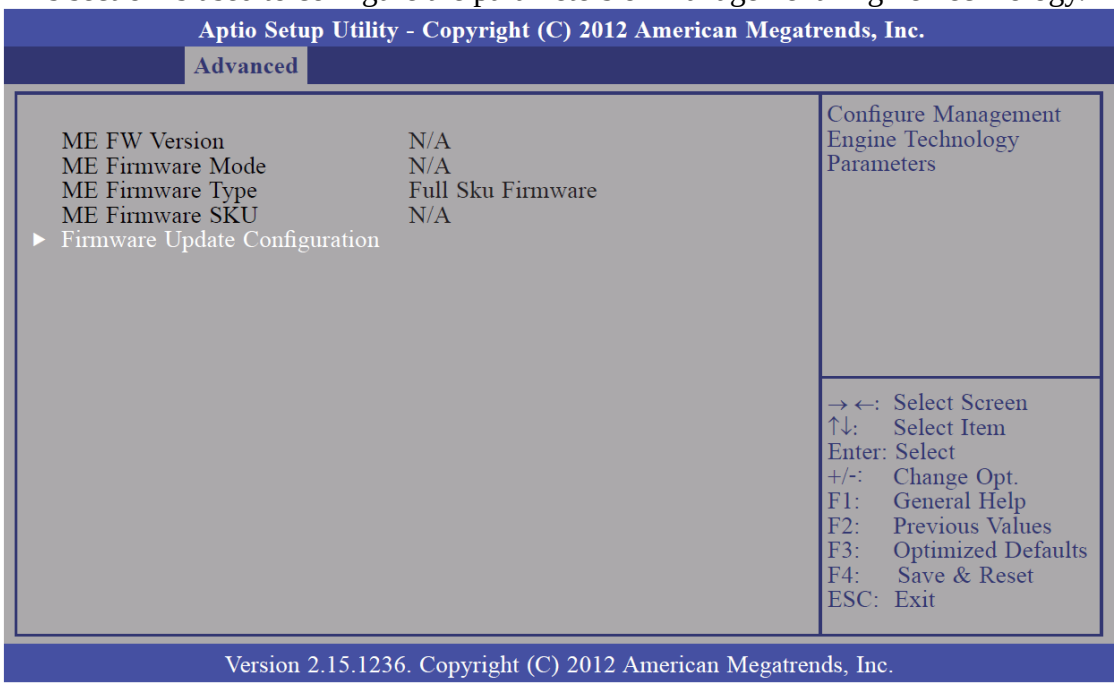
Enables or disables these Serial ATA ports.

Hot Plug

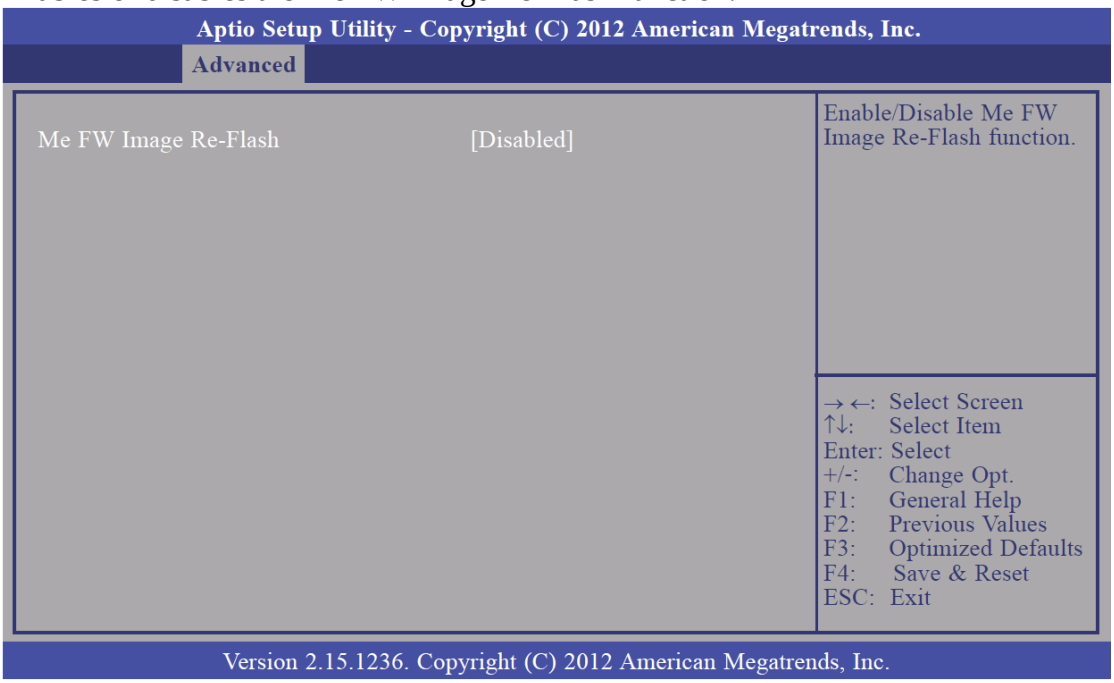
Designates the serial ATA port as hot pluggable.

3.2.5 PCH-FW Configuration

This section is used to configure the parameters of Management Engine Technology.

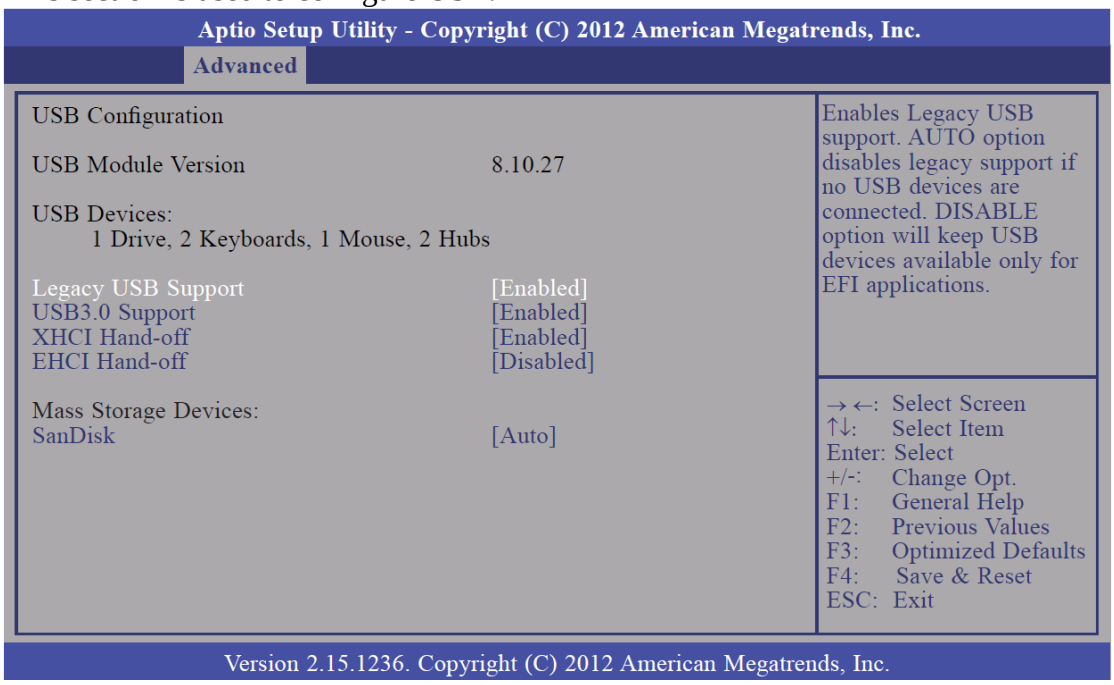

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
ME FW Version N/A
ME Firmware Mode N/A
ME Firmware Type Full Sku Firmware
ME Firmware SKU N/A
▶ Firmware Update Configuration
Configure Management Engine Technology Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Firmware Update Configuration
Enables or disables the Me FW Image Re-Flash function.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Me FW Image Re-Flash [Disabled]
Enable/Disable Me FW Image Re-Flash function.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

3.2.6 USB Configuration

This section is used to configure USB.

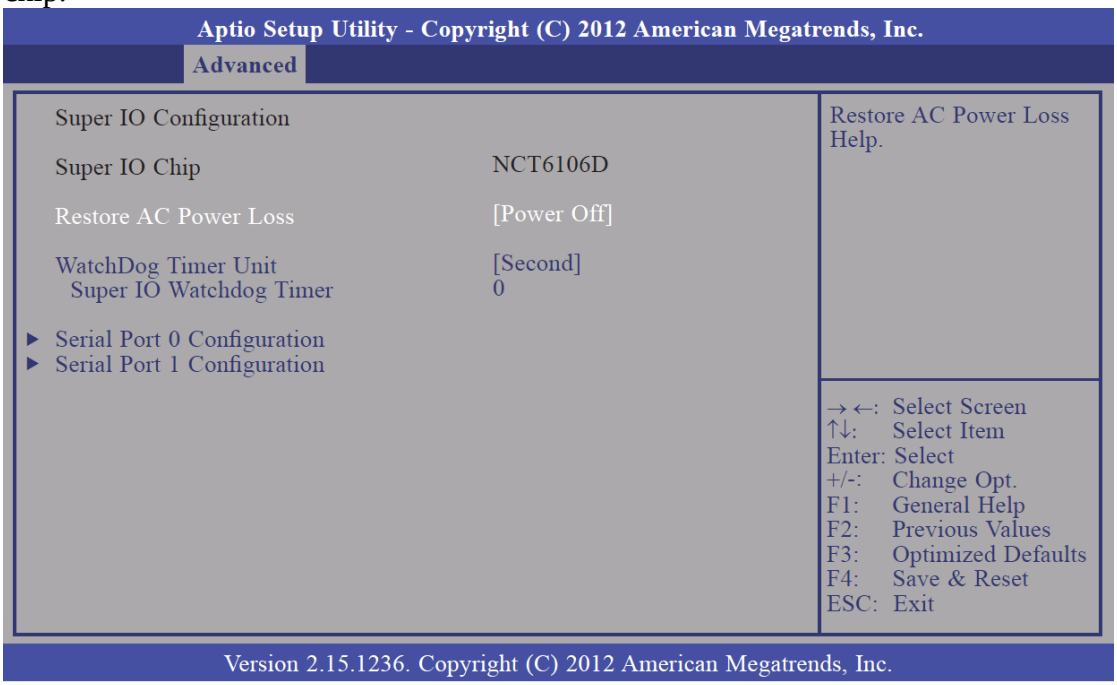

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Configuration
USB Module Version 8.10.27
USB Devices:
1 Drive, 2 Keyboards, 1 Mouse, 2 Hubs
Legacy USB Support [Enabled]
USB3.0 Support [Enabled]
XHCI Hand-off [Enabled]
EHCI Hand-off [Disabled]
Mass Storage Devices:
SanDisk [Auto]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Legacy USB Support
Enabled
Enables legacy USB.
Auto
Disables support for legacy when no USB devices are connected.
Disabled
Keeps USB devices available only for EFI applications.

USB3.0 Support
Enable or disable the support of the USB 3.0 (XHCI) controller.
XHCI Hand-off
This is a workaround for OSes without the support of XHCI hand-off. The change of XHCI ownership should be claimed by the XHCI driver.
EHCI Hand-off
This is a workaround for OSes without the support of EHCI hand-off. The change of EHCI ownership should be claimed by the EHCI driver.

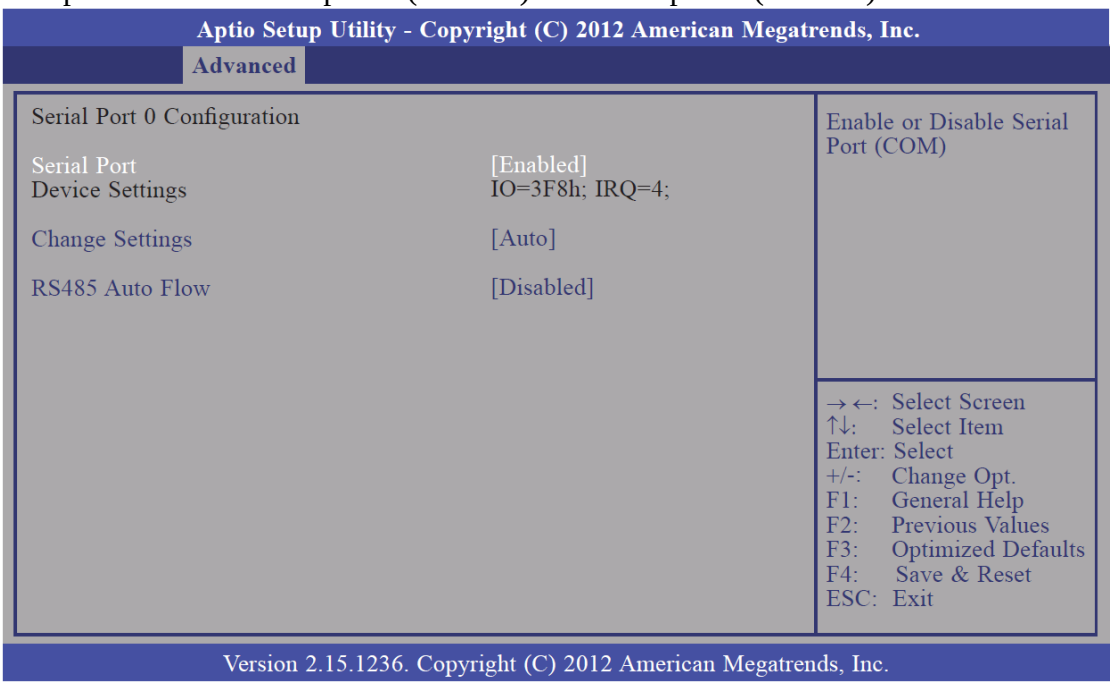
3.2.7 Super IO Configuration

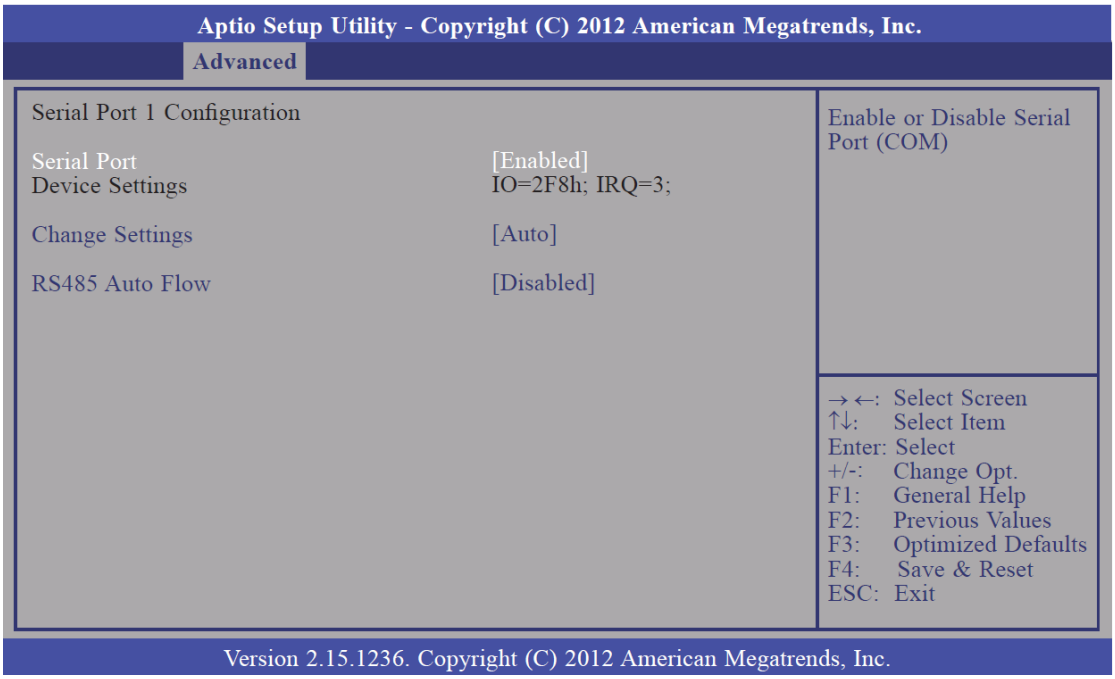
This section is used to configure the I/O functions supported by the onboard Super I/O chip.



Restore AC Power Loss
Power Off
When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.
Power On
When power returns after an AC power failure, the system will automatically power-on.
Last State
When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on
when AC power failure occurs, the system will power-on when power returns.
Watchdog Timer Unit
Selects the watchdog timer unit: second or minute.
Super IO Watchdog Timer
Sets the timeout value of the super IO watchdog timer. 0 means disabled.
Serial Port 0 Configuration and Serial Port 1 Configuration

Sets parameters of serial port 0 (COM A) and serial port 1 (COM B).

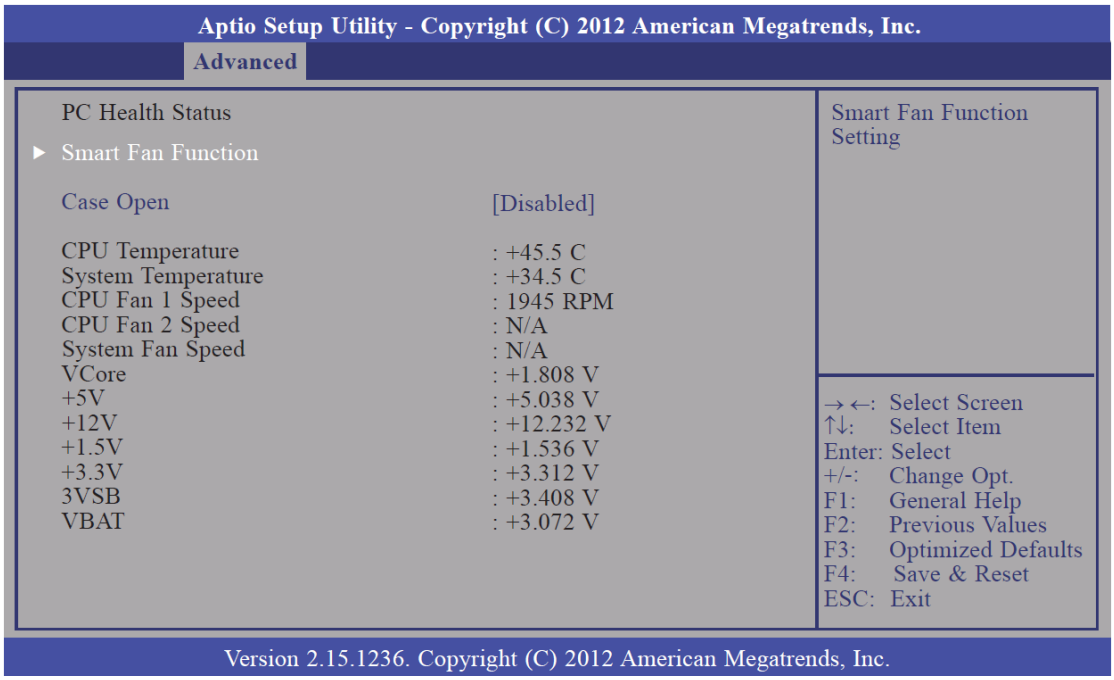




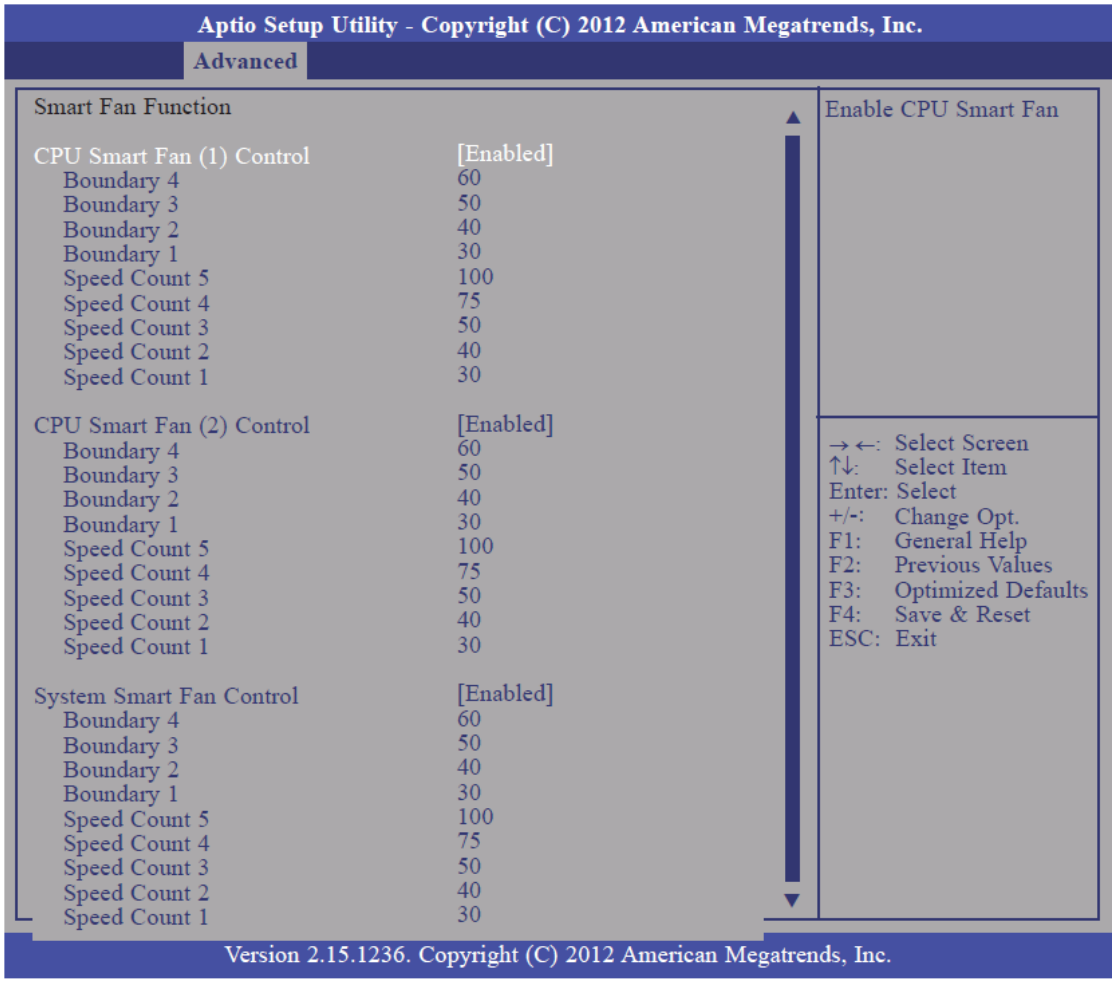
Serial Port
Enables or disables the serial port (COM).
Change Settings
Selects the IO/IRQ settings for the super I/O device.
RS485 Auto Flow
Sets the RS485 auto flow for the serial port.

3.2.8 PC Health Status

This section displays the hardware health monitor.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
PC Health Status
Smart Fan Function
Case Open [Disabled]
CPU Temperature : +45.5 C
System Temperature : +34.5 C
CPU Fan 1 Speed : 1945 RPM
CPU Fan 2 Speed : N/A
System Fan Speed : N/A
VCore : +1.808 V
+5V : +5.038 V
+12V : +12.232 V
+1.5V : +1.536 V
+3.3V : +3.312 V
3VSB : +3.408 V
VBAT : +3.072 V
Smart Fan Function Setting
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Smart Fan Function



CPU Smart Fan Control

When this feature is set to Automatic, the CPU's fan speed will rotate according to the CPU's temperature. The higher the temperature, the faster the speed of rotation.

System Smart Fan Control

When this feature is set to Automatic, the System's fan speed will rotate according to the System's temperature. The higher the temperature, the faster the speed of rotation.

Boundary 1 to Boundary 4

The range is 0-127.

Speed Count 1 to Speed Count 5

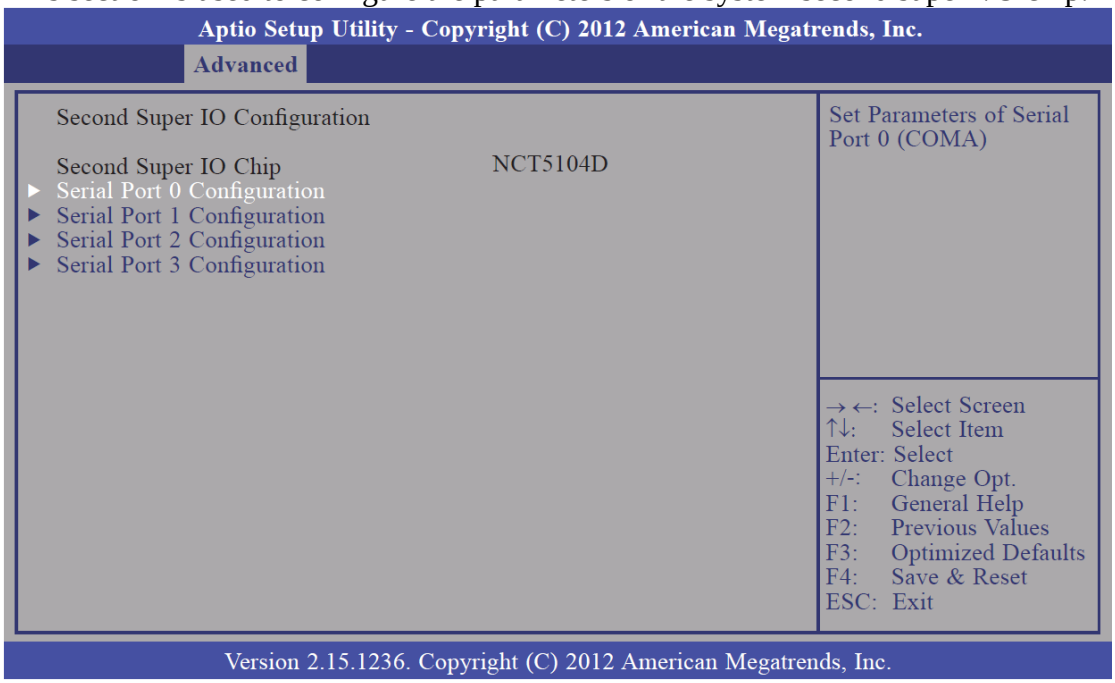
The range is 1-100%.

Case Open

Sets this field to Enabled to allow the system to alert you of a chassis intrusion event.

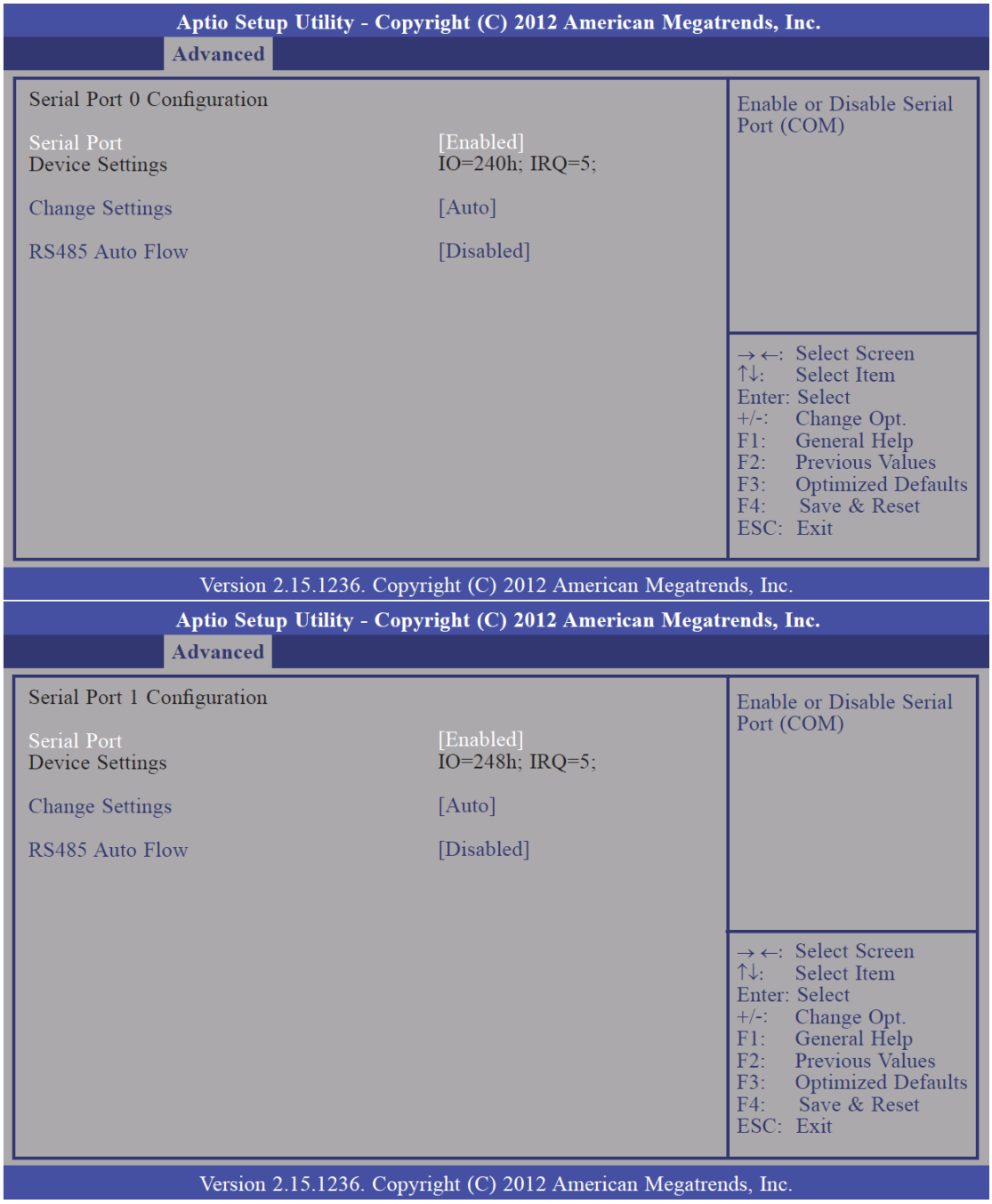
3.2.9 Second Super IO Configuration

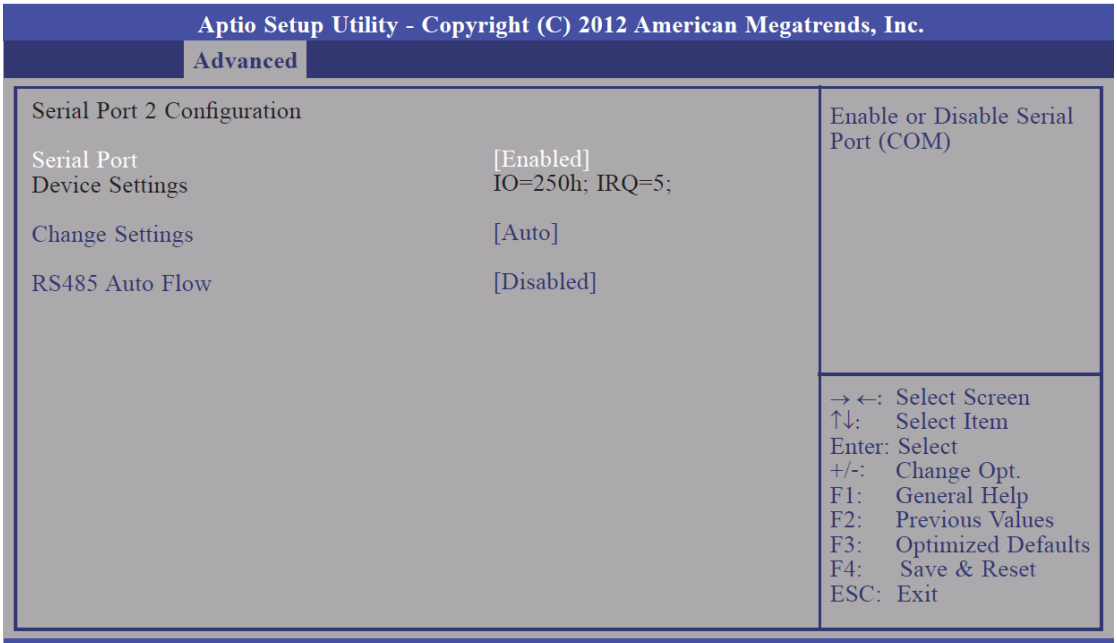
This section is used to configure the parameters of the system second super I/O chip.

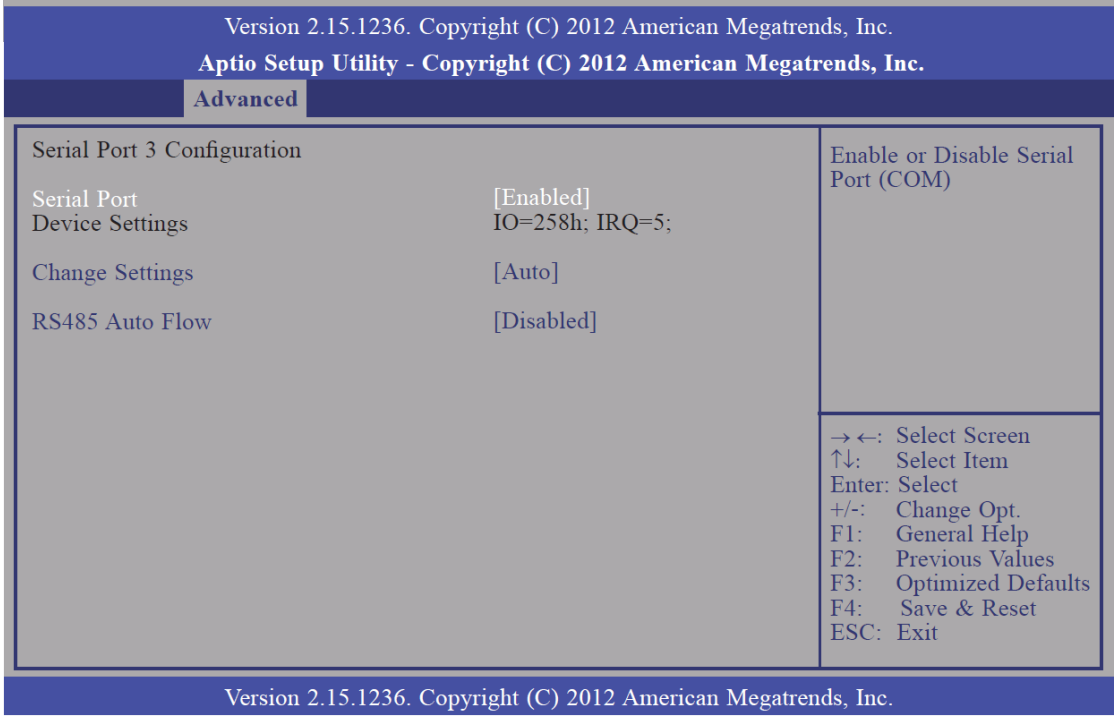


Serial Port 0 Configuration to Serial Port 3 Configuration

Sets parameters of serial port 0 (COM A) to serial port 3 (COM D).


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Serial Port 0 Configuration
Serial Port [Enabled]
Device Settings IO=240h; IRQ=5;
Change Settings [Auto]
RS485 Auto Flow [Disabled]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Serial Port [Enabled]
Device Settings IO=248h; IRQ=5;
Change Settings [Auto]
RS485 Auto Flow [Disabled]
Enable or Disable Serial Port (COM)
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

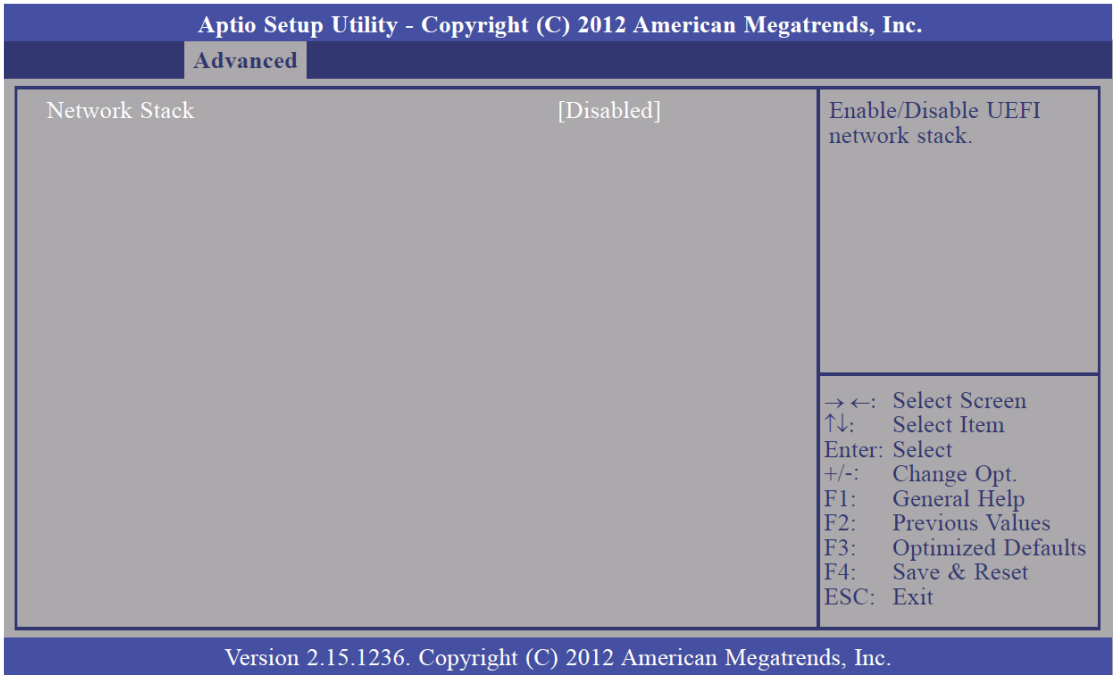




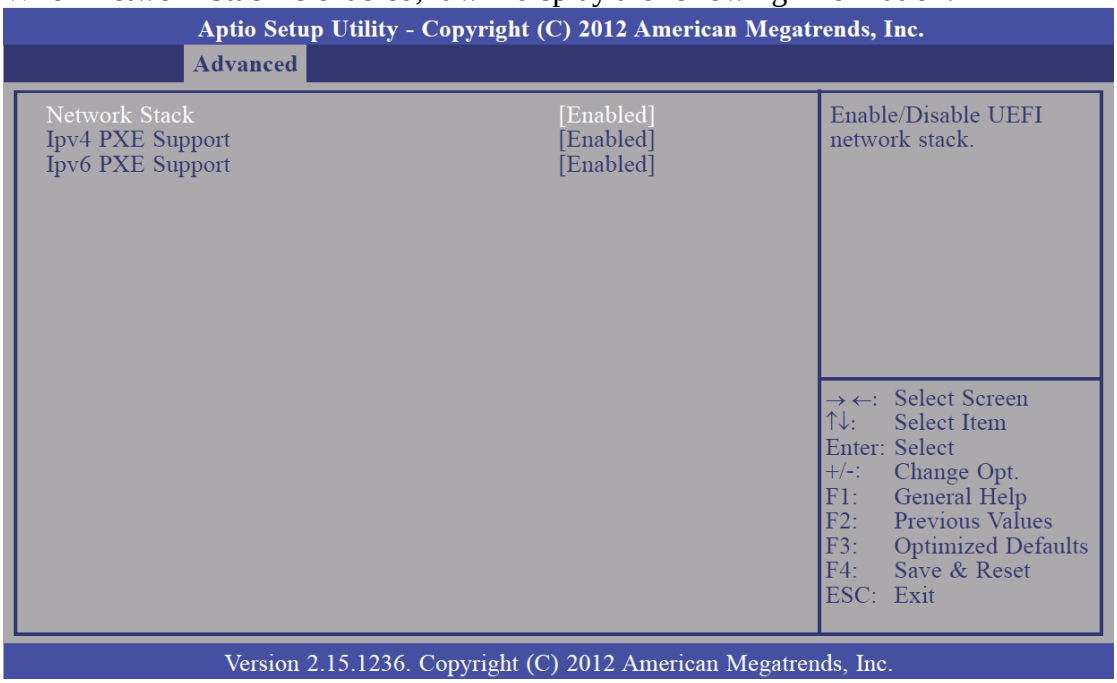
Serial Port
Enables or disables the serial port (COM).
Change Settings
Selects the IO/IRQ settings for the super I/O device.
RS485 Auto Flow
Sets the RS485 auto flow for the serial port.

3.2.10 Network Stack

This section is used to enable or disable UEFI network stack.



When Network Stack is enabled, it will display the following information:



Ipv4 PXE Support

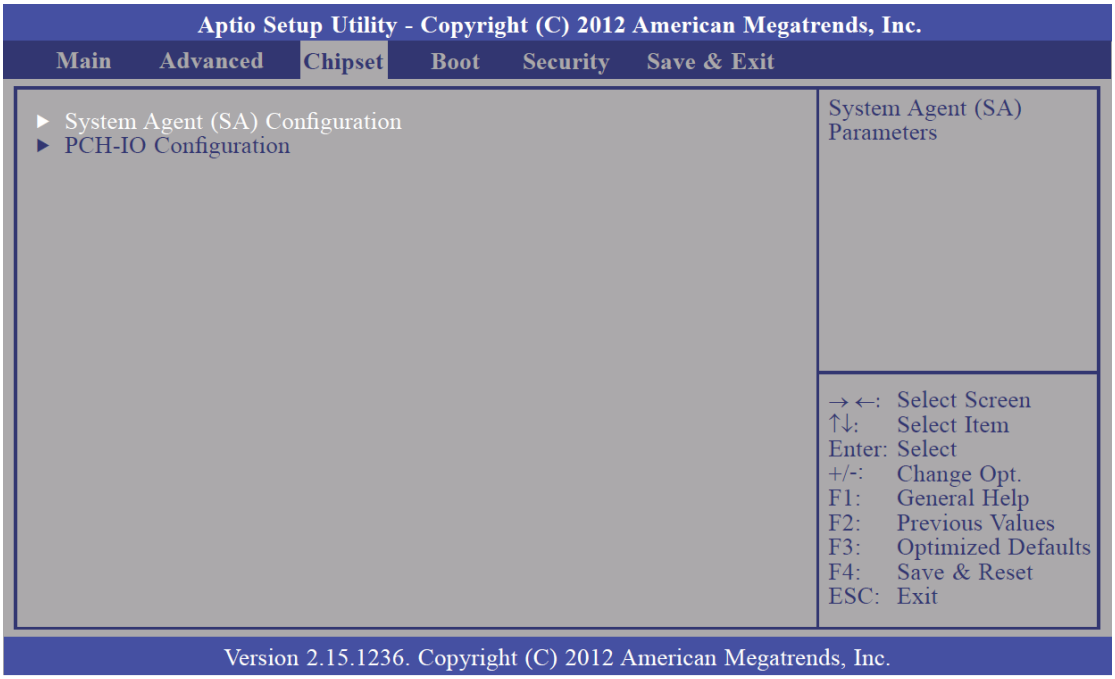
When enabled, Ipv4 PXE boot supports. When disabled, Ipv4 PXE boot option will not be created.

Ipv6 PXE Support

When enabled, Ipv6 PXE boot supports. When disabled, Ipv6 PXE boot option will not be created.

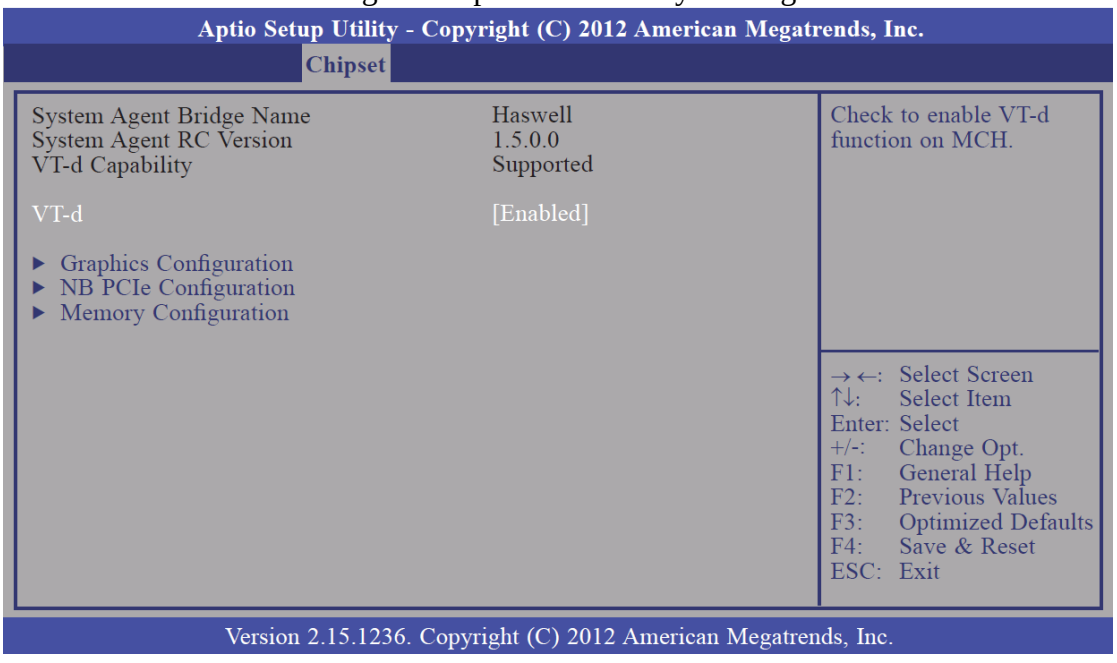
3.3 Chipset

This section configures relevant chipset functions.



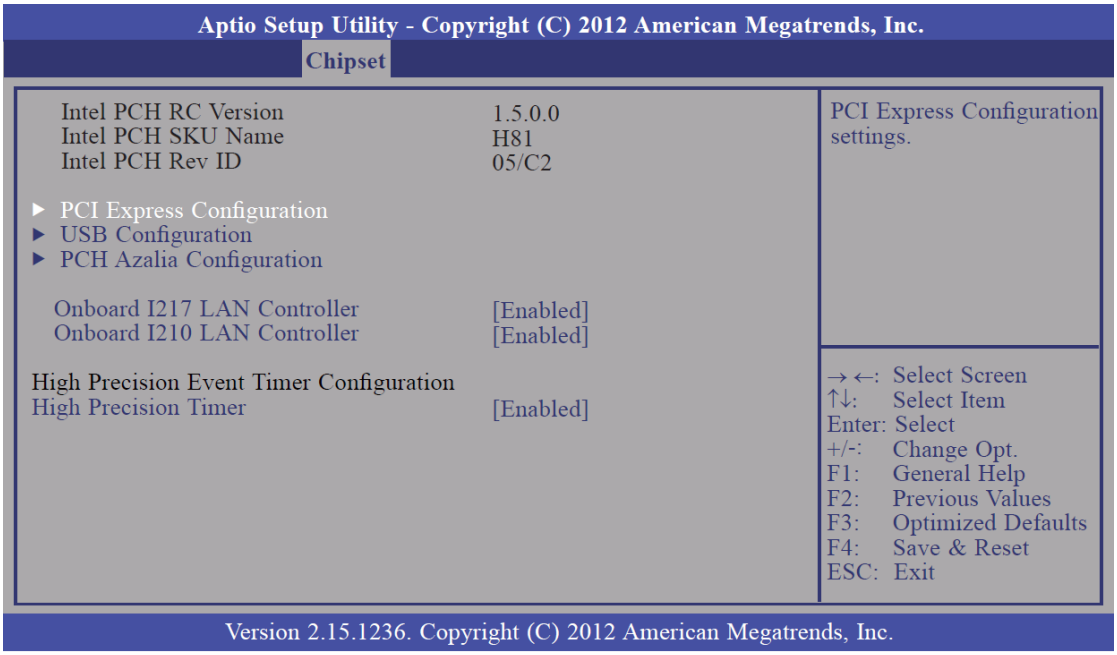
3.3.1 System Agent (SA) Configuration

This section is used to configure the parameters of System Agent.



3.3.2 PCH-IO Configuration

This section illustrates the PCH parameters.


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
Intel PCH RC Version 1.5.0.0
Intel PCH SKU Name H81
Intel PCH Rev ID 05/C2
PCI Express Configuration
USB Configuration
PCH Azalia Configuration
Onboard I217 LAN Controller [Enabled]
Onboard I210 LAN Controller [Enabled]
High Precision Event Timer Configuration
High Precision Timer [Enabled]
PCI Express Configuration settings.
→ ←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Onboard I217 LAN Controller

Enables or disables the onboard I217 LAN controller.

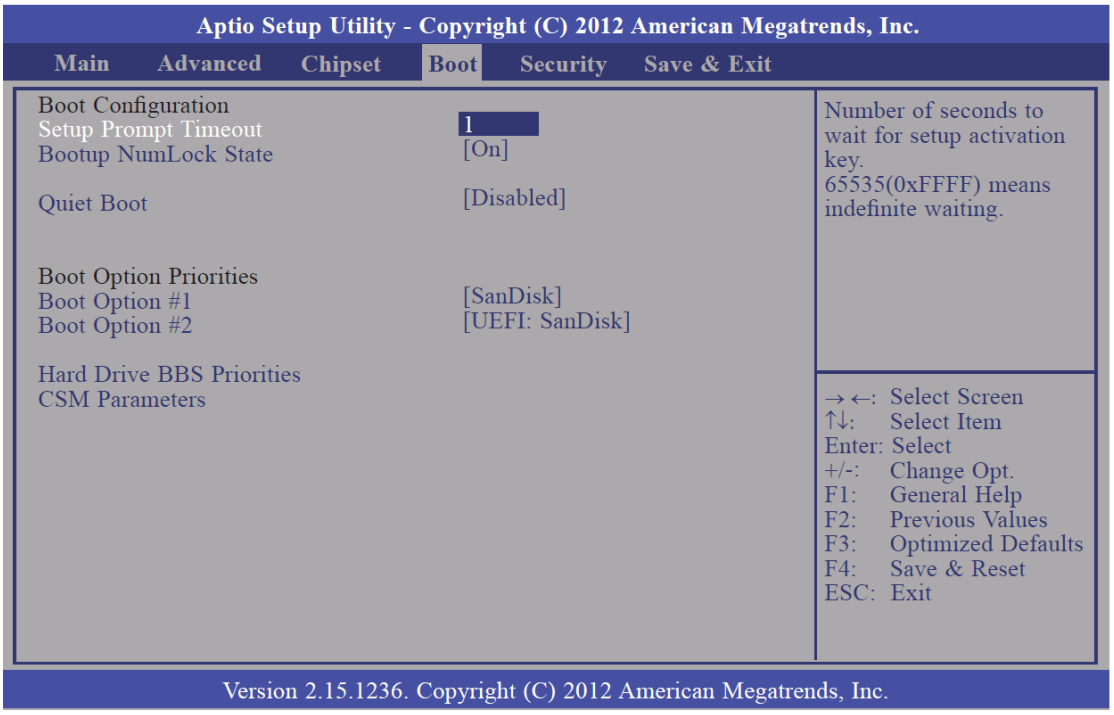
Onboard I210 LAN Controller

Enables or disables the onboard I210 LAN controller

High Precision Timer

Enables or disables the High Precision Event Timer.

3.4 Boot


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Quiet Boot [Disabled]
Boot Option Priorities
Boot Option #1 [SanDisk]
Boot Option #2 [UEFI: SanDisk]
Hard Drive BBS Priorities
CSM Parameters
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→ ←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Setup Prompt Timeout

Selects the number of seconds to wait for the setup activation key. 65535(0xFFFF)

denotes indefinite waiting.

Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

Quiet Boot

Enables or disables the quiet boot function.

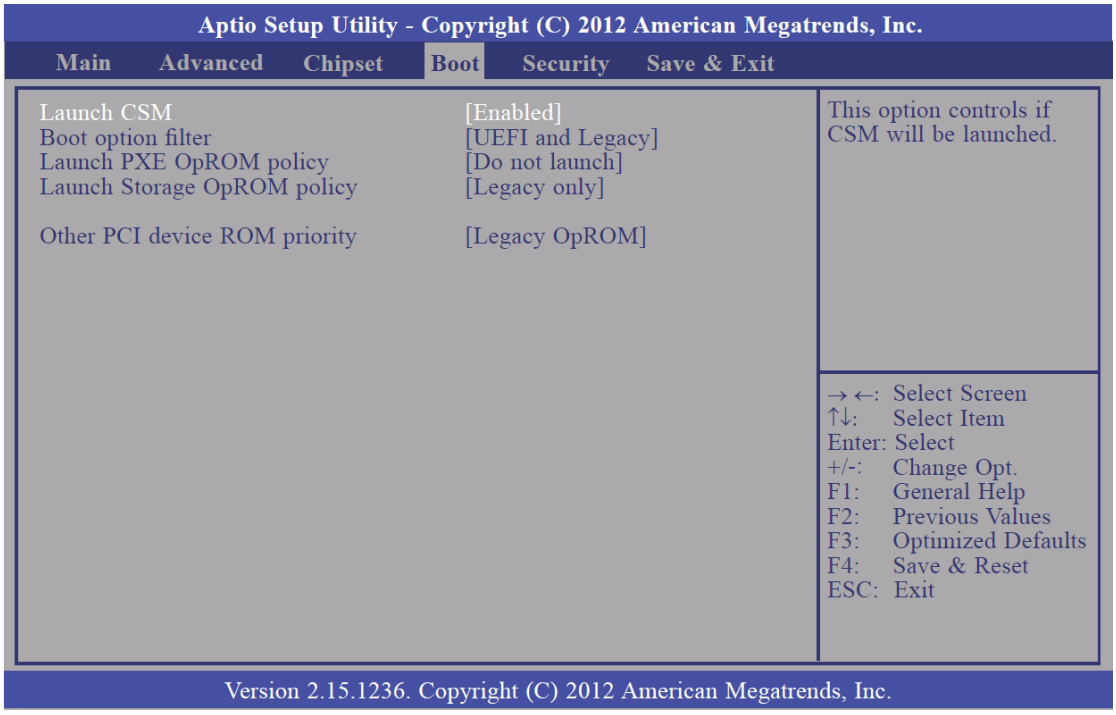
Boot Option

Sets the system boot order.

Hard Drive BBS Priorities

Sets the order of the legacy devices in the group.

3.4.1 CSM Parameters



Launch CSM

This option controls if CSM will be launched.

Boot option filter

This option controls what devices system can be boot to.

Launch PXE OpROM policy

Controls the execution of UEFI and legacy PXE OpROM.

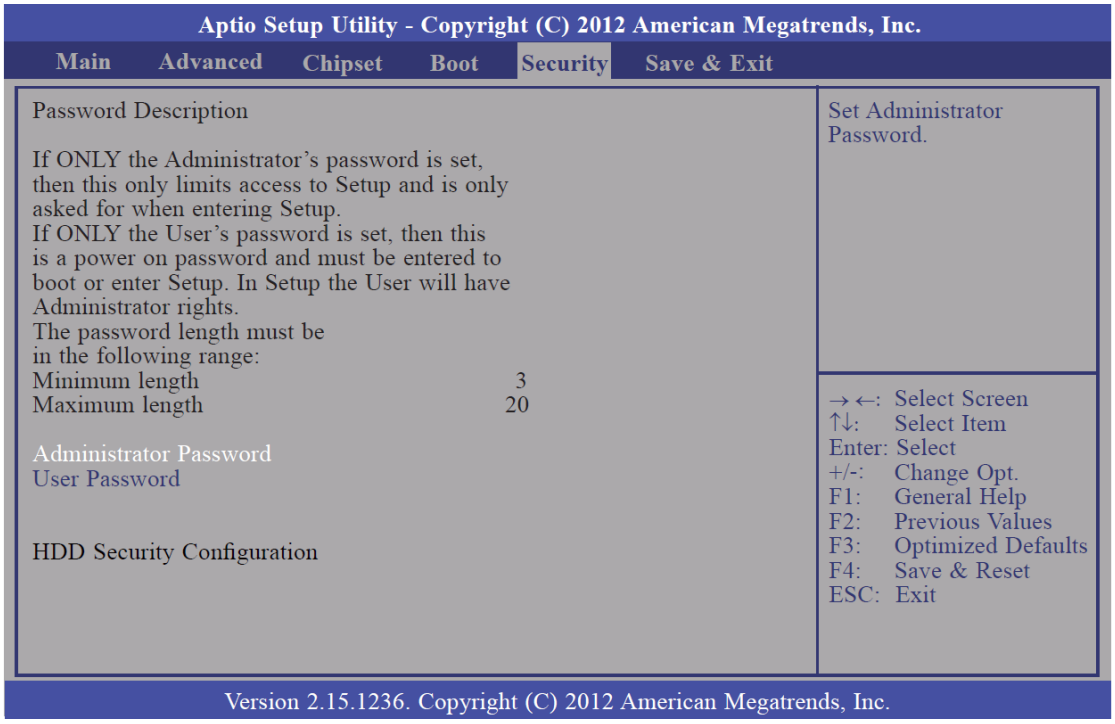
Launch Storage OpROM policy

Controls the execution of UEFI and legacy storage OpROM.

Other PCI device ROM priority

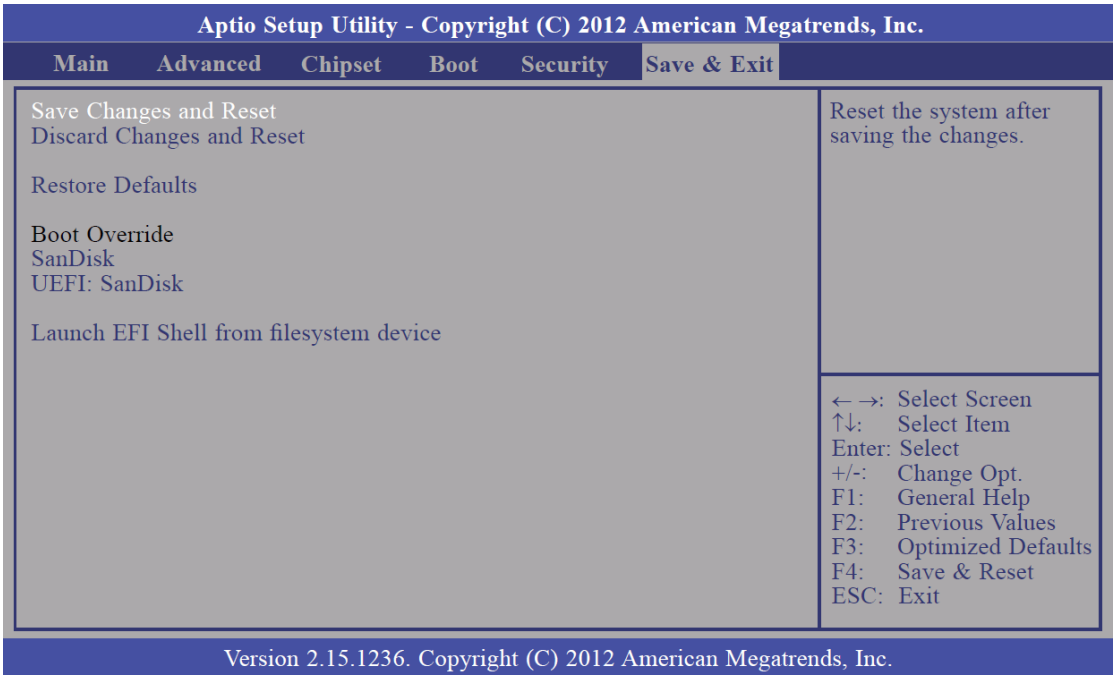
For PCI devices other than Network, Mass Storage, or Video defines which OpROM to launch.

3.5 Security


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
HDD Security Configuration
Set Administrator Password.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Administrator Password
Sets the administrator password.
User Password
Sets the user password.

3.6 Save & Exit


Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Save Changes and Reset
Discard Changes and Reset
Restore Defaults
Boot Override
SanDisk
UEFI: SanDisk
Launch EFI Shell from filesystem device
Reset the system after saving the changes.
←→: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Reset
ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>.A dialog box will appear. Select Yes to restore the default values of all the setup options.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

CHAPTER 4

Driver Installation

The FEBC-5950 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

4.1 Follow the sequence below to install the drivers:

Step 1 – Install Chipset Driver
Step 2 – Install VGA Driver
Step 3 – Install LAN Driver
Step 4 – Install Audio Driver
Please read instructions below for further detailed installations.

4.2 Installation:

Insert the FEBC-5950 CD-ROM into the CD-ROM drive. And install the drivers from Step 1 to Step 4 in order.

Step 1 – Install Chipset Driver
1. Click on the Step 1 - Intel Chipset Software Installation Utility folder and double click on the infinst_autol.exe
2. Follow the instructions that the window shows
3. The system will help you install the driver automatically

Step 2 – Install VGA Driver
1. Click on the Step 2 - Intel Graphics Media Accelerator Driver Production Version folder and select the OS folder your system is
2. Double click on the Setup.exe file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 3 –Install LAN Driver
1. Click on the Step 3 - Realtek folder and select the OS folder
2. Double click on the Setup.exe file
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

Step 4 –Install Audio Driver
1. Click on the Step 4 - Realtek HD Audio Codec folder and select the OS folder your system is
2. Double click on Setup.exe file located in each OS folder
3. Follow the instructions that the window shows
4. The system will help you install the driver automatically

APPENDIX A

Watchdog Sample Code

```
;Software programming example:
;----------------------------------------------
;(1) Enter Super IO Confi guration mode
;----------------------------------------------
MOV DX,4EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------------------------------------------------
;(2) Confi guration Logical Device 8, register CRF0/CRF1 (WDT Control/WDT
timer)
;-----------------------------------------------------------------------------------------
MOV DX,4EH
MOV AL,07H ;Ready to Program Logical Device
OUT DX,AL
MOV DX,4FH
MOV AL,08H ;Select Logical Device 8
OUT DX,AL
MOV DX,4EH
MOV AL, F1H ;Select watchdog timer register
OUT DX,AL
MOV DX,4FH
MOV AL,10H ;Set watchdog timer value
OUT DX,AL
MOV DX,4EH
MOV AL, F0H ;Select watchdog Control Register
OUT DX,AL
MOV DX,4FH
MOV AL,02H ;Set Watchdog Control Value
OUT DX,AL
;-----------------------------------------------------------------
;(1) Exit extended function mode
;-----------------------------------------------------------------
MOV DX,4EH
MOV AL,AAH
OUT DX,AL
```